June 1990 Administration

Provincial Report

Achievement Testing Program

Student Evaluation

Alberta
EDUCATION

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PROVINCIAL REPORT
JUNE 1990 ADMINISTRATION

MESSAGE FROM THE DIRECTOR

The 1990 *Achievement Testing Program Provincial Report* shows how students in Alberta are achieving in the subject areas tested. Students wrote achievement tests in both English and French languages.

Achievement Tests in English

In June 1990, achievement tests were administered in Grade 3 Mathematics, Grade 6 Science, and Grade 9 Language Arts. For each subject tested, we expect that 85% of the student population writing will achieve at an acceptable level and 15% of those will achieve a level of excellence. In Grade 3, students achieved beyond both these expectations. Similarly, in Grade 6, more students than expected achieved a level of excellence; however, the number of students achieving an acceptable level was below what was expected. In Grade 9, the number of students achieving at an acceptable level and at a level of excellence was below what was expected.

Another important measure of achievement is comparing 1990 levels with those in 1986. A special achievement-over-time study was conducted in 1990. Results from this study show that student achievement in 1990 was about the same as in 1986 for each subject area tested. Section 8 of this report provides the details of this study.

Achievement Tests in French

This year, once again, many school systems chose the option of having their Grade 9 students in French language programs write the Grade 9 French Language Arts Achievement Test or their Grade 6 students write the translation of the Grade 6 Science Achievement Test. Results for students in these programs are not reported on a provincial basis as the representativeness of the students writing cannot be assured. Issues related to testing students in French Immersion programs were addressed in a special report prepared in 1989 titled "Provincial Assessment of Students in French Immersion Programs, Special Report." A copy of this report was forwarded to all superintendents as well as to principals with French Immersion programs in their schools. Other individuals can receive a copy of this report upon request.

New Reports

Within this document, two new reports are presented. Provincial student achievement results by gender and by age are reported in sections 6 and 7 respectively. Each school district will receive, in their achievement testing jurisdiction report, comparable information for their students at the district level.

Reporting to Parents

Achievement test results provide educators with an opportunity to inform parents about the strengths of school and jurisdiction programs and about initiatives taken to address any weaknesses. We have included in Appendix D the answers to a number of questions frequently posed by parents concerning the Achievement Testing Program. Local boards, schools, and teachers may find it useful to reproduce and distribute these pages to interested parents or to use Appendix D in district or school newsletters.

Finally, the successes of the Achievement Testing Program are due to the continuing support of teachers, principals, and superintendents who share their expertise and experience with us throughout the development and marking of achievement tests. I look forward to our continued discussions and sharing of ideas in the coming year.

F. Horvath

Frank G. Horvath, Director

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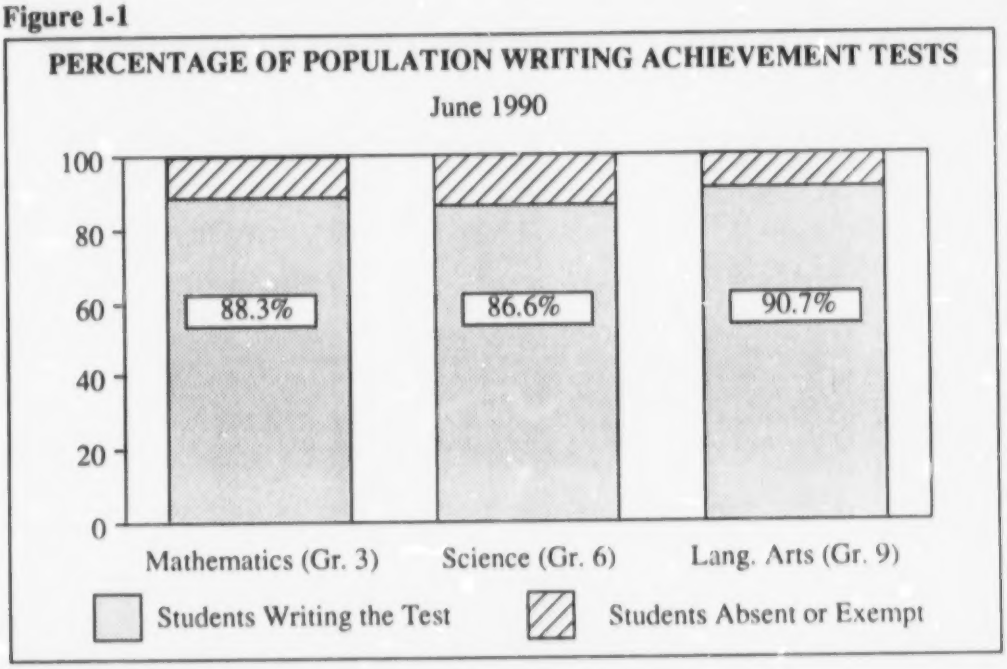
SECTION 1
SUMMARY OF ACHIEVEMENT TEST RESULTS

STUDENT POPULATION

In June 1990, a total of 92 606 achievement tests were administered to students in the province of Alberta. Figure 1-1 shows the percentage of students in grades 3, 6, and 9 who wrote the achievement tests as well as those who were absent or exempt.

Figure 1-1



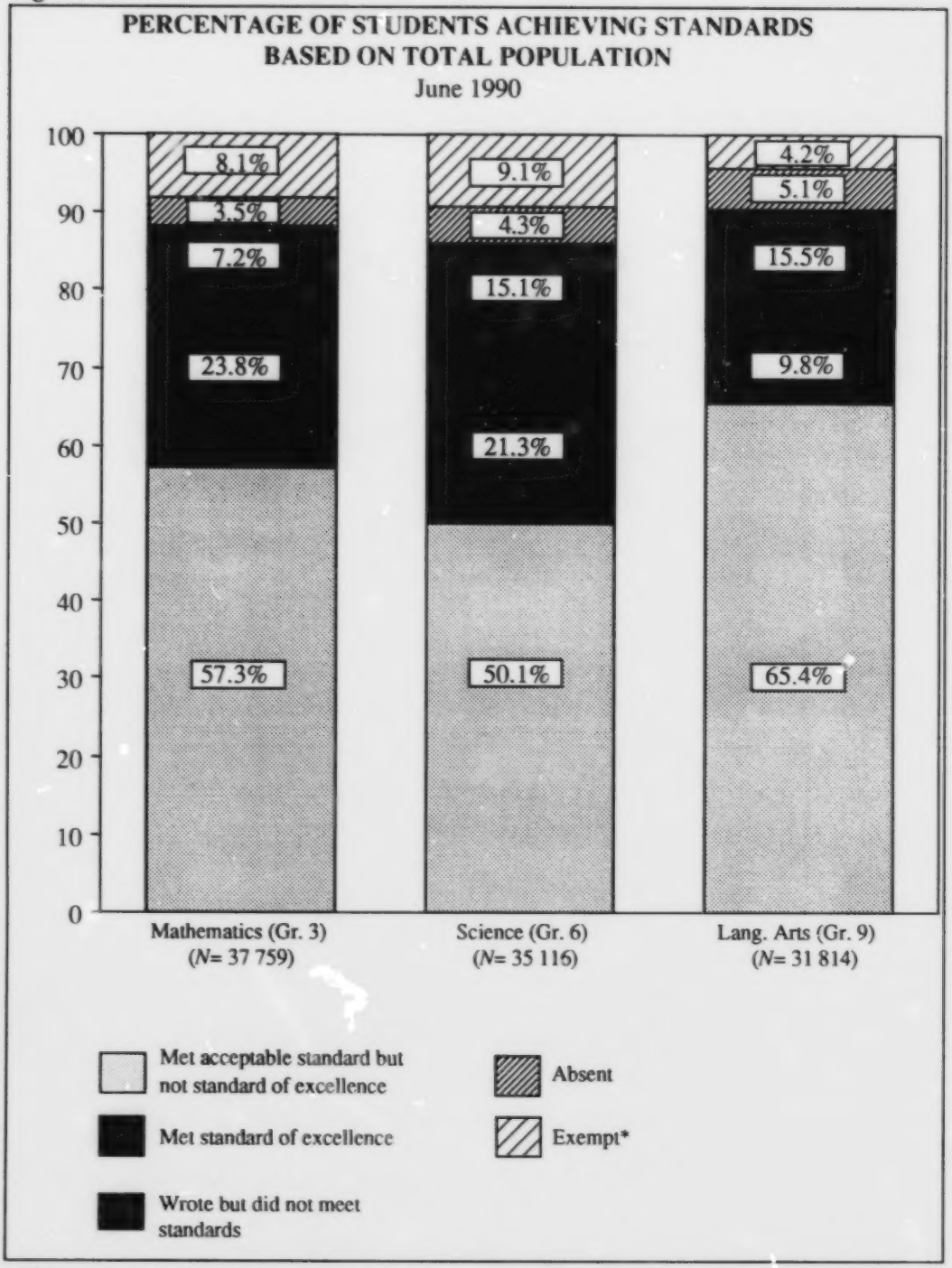
The number of students who were absent on the day the tests were administered or who were exempt from writing is shown in tables 3-3, 4-2, and 5-2.

RESULTS IN RELATION TO STANDARDS FOR THE TOTAL POPULATION OF STUDENTS AT EACH GRADE LEVEL

The discussion in the main body of this report deals with results only for those students who wrote the June 1990 achievement tests. The total population comprises all English language program students who wrote the test and those students who were absent and exempt from writing the test. We are interested in the percentage of students meeting the acceptable standard when absentees and exempted students are included as part of the population. Since it is not known how well the students in the absent and exempt categories would have achieved, these groups are shown as percentages of the total population.

Figure 1-2 presents the number of students achieving the acceptable standard at each of the grades 3, 6, and 9 levels based on total populations.

Figure 1-2



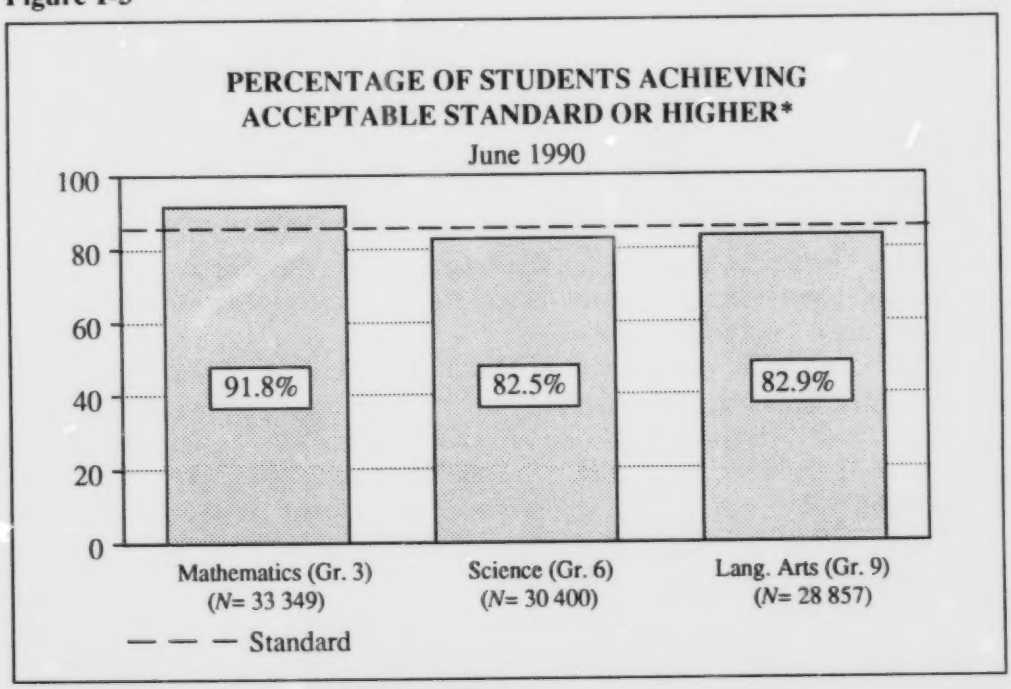
* The exempt category includes students who were enrolled in French Immersion or Francophone programs and who were eligible for exemption but wrote the test in English or French; results are reported separately for these students.

RESULTS IN RELATION TO STANDARDS FOR STUDENTS WHO WROTE THE ACHIEVEMENT TESTS

Through discussions with educators and school administrators and from our experience with measuring student achievement according to the expectations in the *Program of Studies*, we believe it is reasonable to expect that, of the students who wrote the test, at least 85% should achieve at the acceptable level and at least 15% of those should achieve at the level of excellence. As in previous years, results are reported in relation to these standards. Standards are intended to reflect expectations for English language program students who were expected to write the 1990 achievement tests and not for the total population, which would include special needs students, for example.

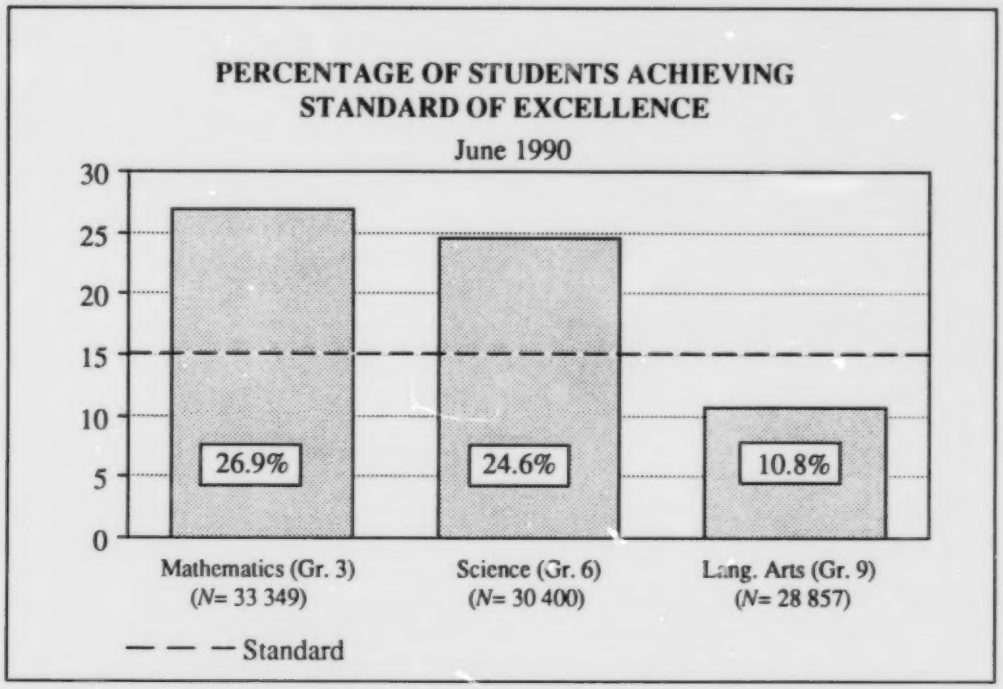
Figures 1-3 and 1-4 present the percentage of students who met the acceptable standard and the standard of excellence.

Figure 1-3



*Includes students achieving standard of excellence

Figure 1-4



INTERPRETATION OF RESULTS

Results presented in figures 1-3 and 1-4 show that the percentage of students achieving the acceptable standard was slightly higher than was expected for Grade 3 but the respective percentages were lower than were expected for grades 6 and 9. For the standard of excellence, percentages were much higher than were expected for grades 3 and 6 and were lower than were expected for Grade 9.

Results in 1990 are similar to results on tests administered in 1986. Section 8 provides more information about this comparison.

These results show that Grade 3 students are learning mathematics at an acceptable level. However, student learning in Grade 6 Science and Grade 9 English Language Arts continues to need improvement to meet standards.

SECTION 2
GUIDELINES FOR INTERPRETING ACHIEVEMENT TEST RESULTS

PROVINCIAL REPORT

Following each administration of the achievement tests, a *Provincial Report* is prepared. This report is a public document that describes the aggregated results obtained by those students who wrote achievement tests in a given year. Provincial reports can be used by school board members, superintendents, principals, and teachers as they review results for students in their own jurisdictions and schools.

By using the *Provincial Report* in this way, policymakers and educators can check their perceptions of local achievement against provincewide standards and trends in the levels of achievement.

This *Provincial Report* describes the results achieved by students who wrote the June 1990 achievement tests in Grade 3 Mathematics, Grade 6 Science, and Grade 9 English Language Arts.

Provincial results for students who wrote the French translation of the Grade 6 Science Achievement Test and the Français 9^{e} Année achievement test will be presented in a separate special report. This report will be available to participating jurisdictions and schools. Other interested individuals may receive a copy of this special report upon request.

JURISDICTION AND SCHOOL REPORTS

In addition to the *Provincial Report*, superintendents and principals receive reports of results achieved by students in their particular jurisdiction or school. The jurisdiction and school reports contain tables that parallel the major tables in the *Provincial Report*.

Policymakers and educators in each jurisdiction are encouraged to study carefully the provincial results and their own test results.

Educators at the school and jurisdiction levels can make three kinds of comparisons to decide if the achievement of their students is "good enough."

One comparison is in relation to expectations or standards; another is in relation to the achievement of students in the entire province of Alberta; and the third is to look at the jurisdiction results in 1986, when these tests were last administered.

Following these comparisons, teachers, principals, and superintendents can identify the strengths in the programs that were delivered in their grades 3, 6, and 9 classrooms. Where the results show weaknesses, changes can be made wherever necessary or desirable.

USE OF THE JURISDICTION AND SCHOOL REPORTS

The reports are NOT intended to be used as the basis for

- making decisions about student placement or promotion
- evaluating teacher performance
- comparing performance between or among schools.

Administrators in each jurisdiction should apply separate locally developed teacher, school, and school system evaluation policies to the tasks of evaluating teacher and school performance.

The information provided in the reports is factual regarding *what* the test results are. The interpretation of this information – hypothesizing *why* results are as they are – involves consideration of the many factors and variables that contribute to achievement.

In addition, it must be noted that the information in these reports is limited to selected objectives of the *Program of Studies*. Many important aspects of learning cannot be measured by the achievement tests, which are time-limited, paper and pencil tests.

CONFIRMING STANDARDS

Standards have been confirmed for each achievement test (see Appendix C). Our judgment is that 85% of students who write the test should be able to meet or exceed the acceptable standard of achievement, and 15% of those should be able to meet or exceed the standard of excellence. Included in the jurisdiction and school reports is a table showing the percentage of students meeting each standard. The table also indicates whether the number of students in that school or jurisdiction who have achieved the standard is significantly different from the expected number (based on the 85% and 15% expectations). A 95% confidence interval is used for these purposes.

Although the statistical tests take the number of students into consideration, it is a useful rule of thumb that results for groups of fewer than 25 students must be interpreted with particular caution. Chance variation in small groups is greater.

Educators interpreting these reports are encouraged to consider how well their students have done compared to the standards.

COMPARING RESULTS TO AVERAGE SCORES

While overall test results are presented in relation to provincial standards, each jurisdiction and school report also provides jurisdiction or school average scores for each reporting category or subtest. Each of these scores may be compared to the provincial average for the same reporting category or subtest to determine if differences exist.

The importance of differences that may exist between jurisdiction or school averages and provincial averages is not always clear. To aid in the interpretation of differences between the averages, jurisdiction and school reports indicate when differences are significant using a 95% confidence interval.

FACTORS LIMITING THE INTERPRETATION OF TEST RESULTS

Educators who are interpreting results must take into account the following limitations:

1. Paper and pencil tests necessarily measure reading ability. Achievement tests are designed to have a readability level equivalent to the grade level being tested. Jurisdictions should consider the average reading level of their grades 6 and 9 students, as reading levels below these grades will have an effect on test results that will be independent of achievement in Science and English Language Arts respectively.

2. If more than 10% of eligible students in a jurisdiction did not write a test, the reported averages for that jurisdiction may not accurately represent the true averages.

3. Consideration should be given to the degree to which students in particular classes or grades were motivated to perform to their level of ability.

FACTORS THAT MAY AFFECT STUDENT ACHIEVEMENT

Results on the achievement tests may have been affected by:

1. Environment
   - community environment
   - school environment including staff morale
   - socioeconomic background
   - family circumstances

2. Personal Factors
   - ability
   - attitude
   - motivation
   - aspiration
   - academic background
   - learning style

3. Availability and Appropriateness of Resources
   - programs of study
   - curriculum guides
   - resource materials
   - library services
   - current textbooks
   - references

4. Instruction
   - teacher qualifications (i.e., to teach a particular subject)
   - teacher experience
   - teacher morale
   - professional development
   - staff turnover
   - professional support
   - teaching strategies
   - timetabling constraints or influences

SECTION 3
GRADE 3 MATHEMATICS

GENERAL DESCRIPTION

The Grade 3 Mathematics Achievement Test had two sections. Section I consisted of 50 multiple-choice questions and Section II had four timed tests of addition, subtraction, multiplication, and division operations. Each timed test contained 32 questions.

The information presented in this section is based on the results achieved by 33 349 students.

SUMMARY OF RESULTS

RESULTS IN RELATION TO STANDARDS

Results show that 91.8% of the students who wrote the test achieved the acceptable standard and 26.9% achieved the standard of excellence. These results exceeded expectations set for Grade 3 students. The acceptable standard and the standard of excellence were established by using a process for confirming standards (see Appendix C).

AVERAGE SCORE

The average score for the Grade 3 Mathematics test was 70.1%, with a standard deviation of 17.5.

CONTENT OF THE TEST

The Grade 3 Mathematics Achievement Test was designed to reflect the *Grade 3 Mathematics Curriculum Specifications* (revised May 1986) that were developed from the 1982 Elementary Mathematics *Program of Studies*. The scope of the test was limited to curriculum objectives that could be effectively measured on a paper and pencil test. As a result, questions were drawn from the subject matter and the problem-solving components only.

The test did not measure student attitudes or student skills in using manipulatives. Questions on the subject matter test measured achievement at three cognitive levels:

- knowledge
- comprehension
- application

Table 3-1 presents the blueprint used to develop Section I of the Grade 3 Mathematics Achievement Test. Classification of each question by component, subtest, and cognitive level is indicated in the table.

Table 3-1
Grade 3 Mathematics
Achievement Test Blueprint
Section I

Content	Subject Matter by Cognitive Level			Problem-Solving Skills	Total Number of Questions
	Knowledge	Comprehension	Application		
Section I, Part A					
Numeration	*3, 8*	*1, 2, 4, 5, 6, 9, 12, 13, 14, 15*	*7*	*10, 11*	15
Geometry	*18*	*17*	*16, 20*	*19*	5
Graphing	*24*	*25*	*21, 22*	*23*	5
Part A: Number of Questions	4	12	5	4	25
Section I, Part B					
Operations and Properties	*26, 27, 31, 38*	*29, 30, 32, 34, 36*	*28, 33*	*35, 37*	13
Measurement	*43*	*40, 41, 42, 44*	*45, 48*	*39, 46*	9
Problem-Solving Strategies	–	–	–	*47, 49, 50*	3
Part B: Number of Questions	5	9	4	7	25
SECTION I Total Number of Questions	9	21	9	11	50

Table 3-2 presents the blueprint used to develop Section II of the Grade 3 Mathematics Achievement Test. This section consisted of four timed tests, measuring student mastery of operations involving sums and minuends to 18, and products and dividends to 45.

Table 3-2
Grade 3 Mathematics
Achievement Test Blueprint
Section II

Operations	No. of Questions
Addition	32
Subtraction	32
Multiplication	32
Division	32

STUDENTS TESTED, ABSENT, AND EXEMPT

Table 3-3 presents the number and percentage distribution of students who wrote the Grade 3 Mathematics Achievement Test, who were absent, or who were exempt. Results for students in French Immersion or Francophone programs who wrote the test in English will be reported separately to participating schools and jurisdictions.

Table 3-3
Grade 3 Mathematics
Students Included in Provincial Results, Absentees, and Exemptions

Category	Number of Students	Percentage of Students
Students Included in Provincial Results	33 349	88.3
Students Absent	1 340	3.5
Students Exempt:	3 070	8.1
Special Needs	852	2.3
Not Taught Subject This Term	12	0.0
ESL Classes	441	1.2
Language of Instruction Not English*	1 717	4.5
Other (approved by Director)	48	0.1

* 1 093 of these students wrote the test in English. Results are being reported directly to schools and jurisdictions. These students were not necessarily representative; therefore, their results are not included in this provincial report. For further information, contact the Student Evaluation Branch, Alberta Education.

RESULTS FOR THE TOTAL TEST

RESULTS IN RELATION TO STANDARDS

Table 3-4 shows the percentage of students achieving the acceptable standard and the standard of excellence. These levels of performance exceeded both the acceptable standard and the standard of excellence.

Table 3-4
Grade 3 Mathematics
Percentage of Students Achieving Standards

Level of Standard	Raw Score Representing Standard	Percentage of Students Achieving at or Above Standard	
		Expectation	Actual
Total Test (Max. Possible Score = 50)			
Acceptable Standard	22	85.0	91.8
Standard of Excellence	42	15.0	26.9
Problem Solving (Max. Possible Score = 11)			
Acceptable Standard	3	85.0	95.4
Standard of Excellence	8	15.0	45.3
Subject Matter (Max. Possible Score = 39)			
Acceptable Standard	19	85.0	90.0
Standard of Excellence	33	15.0	30.0

The number of students achieving the acceptable standard and the standard of excellence for each jurisdiction was analysed to determine whether jurisdictions were below expectations, meeting expectations, or above expectations. Jurisdictions classified as meeting expectations were those for which the difference between the actual number of students and the expected number of students at or above expectations was not statistically significant. A 95% confidence interval was used: this criterion means that differences are only reported when there is a 5% or smaller probability that a difference of that size could occur by chance.

The results are reported in Table 3-5. The percentages in the table are based on 243 jurisdictions (including private schools).

Table 3-5
Grade 3 Mathematics
Percentage Distribution of Jurisdictions* Meeting Expectations

Level of Standard	Below Expectation	Meeting Expectation	Above Expectation
Total Test			
Acceptable Standard**	6.5	58.1	35.3
Standard of Excellence***	1.9	50.2	47.9
Problem Solving			
Acceptable Standard	1.4	48.8	49.8
Standard of Excellence	1.4	20.0	78.6
Subject Matter			
Acceptable Standard	11.2	62.8	26.0
Standard of Excellence	2.3	42.8	54.9

*Jurisdictions with fewer than five students are excluded, as the statistical significance of the frequencies compared to the expectations cannot be calculated.

**Acceptable Standard: 85% of students are expected to achieve at or above the acceptable standard.

***Standard of Excellence: 15% of students are expected to achieve at or above the standard of excellence.

RESULTS FOR SECTION I

Table 3-6 shows the total marks possible and the provincial raw score results for the reporting categories of Section I of the Grade 3 Mathematics Achievement Test.

It is important to stress that the averages on the various reporting categories cannot be directly compared with one another. Rather, the results shown in Table 3-6 can best be used in conjunction with parallel tables in the jurisdiction and school reports. Variations in patterns of students' responses can help to indicate strengths and weaknesses in local educational programs.

Table 3-6
Grade 3 Mathematics
Section I
Raw Score Results by Reporting Category

Reporting Category	Total Marks Possible	Raw Score Average	Standard Deviation
Total	50	35.1	8.7
Major Component			
Problem Solving	11	7.0	2.5
Subject Matter	39	28.1	6.7
Subtest			
Numeration	15	11.0	2.8
Operations and Properties	13	9.2	2.7
Measurement	9	6.2	1.9
Geometry	5	3.2	1.4
Graphing	5	3.7	1.3
Problem-Solving Strategies	3	1.8	0.9
Cognitive Level			
Knowledge	9	6.8	1.7
Comprehension	21	15.2	3.8
Application	9	6.1	2.1

FREQUENCY DISTRIBUTION OF RAW SCORES

Table 3-7 presents the percentage of students who obtained each score (relative frequency) on the Grade 3 Mathematics Achievement Test and the percentage of students who scored at or below each score (cumulative frequency).

Table 3-7
Grade 3 Mathematics
Section I
Frequency Distribution of Raw Scores

Total Raw Score	Relative Frequency (%)	Cumulative Frequency (%)	Total Raw Score	Relative Frequency (%)	Cumulative Frequency (%)
0	0.0	0.0	26	2.4	17.8
1	0.0	0.0	27	2.5	20.4
2	0.0	0.0	28	2.7	23.0
3	0.0	0.0	29	2.8	25.8
4	0.0	0.0	30	3.0	28.8
5	0.0	0.1	31	3.2	31.9
6	0.0	0.1	32	3.5	35.4
7	0.1	0.1	33	3.5	38.9
8	0.1	0.2	34	3.9	42.8
9	0.1	0.3	35	4.1	46.9
10	0.1	0.4	36	4.1	51.0
11	0.2	0.6	37	4.2	55.2
12	0.3	0.9	38	4.4	59.6
13	0.3	1.2	39	4.5	64.1
14	0.4	1.6	40	4.5	68.6
15	0.6	2.2	41	4.5	73.2
16	0.7	2.8	42	4.3	77.4
17	0.9	3.7	43	4.3	81.8
18	0.9	4.6	44	4.1	85.9
19	1.0	5.6	45	3.8	89.6
20	1.2	6.8	46	3.3	92.9
21	1.4	8.2	47	2.9	95.9
22	1.5	9.7	48	2.1	98.0
23	1.8	11.5	49	1.4	99.4
24	1.8	13.3	50	0.6	100.0
25	2.1	15.5			

PERCENTAGE OF STUDENTS CHOOSING EACH ALTERNATIVE

Table 3-8 shows the percentage of students who chose each alternative (A, B, C, and D) for each multiple-choice question. The correct response (key) for each question is also identified.

The results shown in Table 3-8 can best be used in conjunction with the parallel tables in the jurisdiction and school reports. Variations in patterns of students' responses to questions can help to indicate strengths and weaknesses in local educational programs.

Table 3-8
Grade 3 Mathematics
Section I
Results for Individual Multiple-Choice Questions*

Item	Key	Distribution of Responses (%)				Item	Key	Distribution of Responses (%)			
		A	B	C	D			A	B	C	D
1	D	1.6	2.4	1.6	93.9	26	D	2.2	3.4	2.7	90.0
2	A	79.2	5.5	5.9	8.3	27	B	3.6	90.0	3.7	1.7
3	C	8.4	7.7	77.8	5.2	28	D	23.3	4.4	12.2	58.9
4	A	53.8	9.4	6.2	29.0	29	C	4.6	5.1	80.5	8.4
5	C	3.5	12.8	70.3	12.7	30	C	1.4	6.9	86.7	4.2
6	A	68.1	12.5	5.6	12.8	31	A	74.8	5.8	1.3	16.2
7	B	11.7	50.5	26.6	10.3	32	A	65.0	12.6	14.8	5.7
8	A	79.7	15.9	1.8	1.5	33	B	8.2	76.5	7.5	6.6
9	D	57.6	2.7	1.3	37.9	34	D	11.1	5.0	36.5	44.5
10	C	3.4	2.8	91.3	1.7	35	D	7.6	7.1	5.4	79.1
11	B	15.1	65.6	11.6	5.9	36	A	61.9	23.2	5.6	8.4
12	A	92.4	2.7	1.1	2.7	37	C	16.1	13.7	50.6	17.1
13	B	6.1	88.8	3.0	1.4	38	D	9.2	9.1	22.3	56.8
14	C	7.2	4.7	85.8	0.7	39	B	17.8	58.8	7.7	14.6
15	A	62.4	16.8	10.2	8.7	40	B	10.3	59.1	26.3	1.8
16	A	78.6	9.5	5.4	4.9	41	C	6.8	14.9	67.2	9.0
17	D	1.3	28.3	4.3	65.0	42	B	4.3	85.3	3.4	5.3
18	D	8.6	28.8	2.7	58.9	43	B	15.5	71.1	5.3	5.3
19	C	28.1	9.0	45.0	14.9	44	A	96.2	0.3	1.0	0.3
20	D	3.3	6.0	17.3	72.2	45	B	7.5	42.2	8.4	40.0
21	A	88.8	3.0	5.2	1.6	46	C	19.0	6.2	59.7	11.8
22	C	11.5	11.0	63.4	11.5	47	C	4.4	3.9	84.5	2.8
23	B	14.6	64.4	11.6	7.0	48	D	14.2	2.7	1.8	77.6
24	C	3.3	5.8	82.4	6.0	49	C	23.4	12.8	53.7	5.8
25	C	0.6	22.2	73.1	1.5	50	B	17.0	45.7	14.0	17.0

*The sum of the percentages for each question may be less than 100% because the No Response category is not included. This category is less than 7% for any one of these questions.

RESULTS FOR SECTION II

This section of the test measured student mastery of operations in addition, subtraction, multiplication, and division; that is, it measured student speed and accuracy.

Table 3-9 presents the results in terms of the number of questions students answered correctly in two minutes and the number of questions students attempted in two minutes.

Table 3-9
Grade 3 Mathematics
Section II
Speed and Accuracy for Operations

Operations	Time Allotted (min)	Number of Questions on the Test	Average Number of Questions Attempted	Average Number of Questions Answered Correctly
Addition	2	32	26.2	25.6
Subtraction	2	32	23.4	21.9
Multiplication	2	32	22.8	20.7
Division	2	32	21.0	16.9

FREQUENCY DISTRIBUTION OF RAW SCORES

Table 3-10 presents the percentage of students who obtained each score (relative frequency) on each timed test. Frequencies have been rounded to the nearest tenth of a per cent.

Table 3-10
Grade 3 Mathematics
Section II
Frequency Distribution of Raw Scores

Score	Relative Frequency			
	Addition	Subtraction	Multiplication	Division
0	0.1	0.2	0.4	1.7
1	0.0	0.1	0.3	1.2
2	0.0	0.1	0.3	1.5
3	0.0	0.2	0.5	1.8
4	0.1	0.3	0.7	2.4
5	0.1	0.5	0.8	2.5
6	0.2	0.7	1.4	2.8
7	0.3	1.0	1.9	3.3
8	0.5	1.4	1.9	3.6
9	0.5	1.6	2.6	3.6
10	0.6	1.9	2.7	3.9
11	0.7	2.5	2.9	3.8
12	1.0	2.9	3.1	3.8
13	1.4	3.0	3.5	4.0
14	1.6	3.3	3.8	4.0
15	2.1	4.1	3.8	3.9
16	3.2	4.4	3.6	3.6
17	2.2	3.8	3.7	3.6
18	2.4	4.4	4.0	3.4
19	3.0	4.8	4.0	3.4
20	3.7	4.7	3.9	3.0
21	3.0	4.1	3.5	3.0
22	3.2	3.8	3.4	2.7
23	3.8	3.2	3.1	2.4
24	4.4	3.0	3.2	2.4
25	3.6	2.5	2.7	2.1
26	4.4	2.5	2.8	2.0
27	4.2	2.6	2.7	2.1
28	4.9	3.0	3.1	2.4
29	4.3	2.6	3.3	2.3
30	5.0	3.6	3.8	2.9
31	10.2	7.1	5.8	4.0
32	25.5	16.1	13.0	7.0

GRADE 3 MATHEMATICS EXAMINERS' REMARKS

The Grade 3 teachers who confirmed standards felt that, generally, the test reflected the essence of the Grade 3 Mathematics Program. In addition, the teachers agreed that the test required a higher level of thinking where students were required to do more work at a symbolic level in dealing with multistep questions. The teachers felt that because of the higher level of thinking required, the 1990 test was more difficult than the 1986 test.

On the 1990 test, more students met or exceeded the standard of excellence and more students achieved an acceptable standard of performance compared to 1986 performance levels. On the 1990 test, 26.9% of the students met or exceeded the standard of excellence and 91.8% of the students achieved the acceptable level of performance. (See pages 52 to 54 of this report.) Comparable standards set in 1990 for the 1986 test indicate that 24.8% of the students would have met or exceeded the standard of excellence and 90.1% of the students would have achieved an acceptable standard of performance.

Based on the results of the 1990 test, we can say that, generally, students at the acceptable level and beyond have sufficiently demonstrated their knowledge and comprehension of the Grade 3 Mathematics curriculum objectives. The following are some selected examples where students at the acceptable level and beyond showed an adequate to strong grasp of mathematical concepts at the Grade 3 level.

Students knew the value and the unique characteristic of zero, the symbols > and <, and the fractions 1/3 and 2/3. Place value was understood at the pictorial level. Students could match a number with its corresponding name, and they could recognize related number sentences. In geometry and graphing, students could recognize symmetry, identify an object by its corresponding shapes, read and interpret simple graphs, read and understand geometrical terms such as a sphere and an edge, and find an object on a grid. In measurement, students knew the order of the months of the year; they could identify the appropriate instrument of measure for a specific object, read a thermometer showing a temperature below zero, and count coins to a dollar value. In estimation, students could estimate the length of 10 cm.

In procedural knowledge, students demonstrated a sound understanding of operations and properties by showing that they could add and subtract with regrouping, and that they could multiply a one-digit number by 100. They could solve two-step problems at the pictorial level, and they knew which relevant information and mathematical operation to use to solve a one-step problem.

Students who performed at the level of excellence demonstrated more success and understanding in solving symbolic and multistep problems than the students who performed at the acceptable level. Specifically, these students demonstrated an understanding of expanded notation at the symbolic level. They could multiply a two-digit number by 10, solve complex diagrammatic number pattern problems, and solve a problem that begins with an unknown. They knew how to identify and use the mathematical operations to solve multistep and word problems; they could interpret, synthesize, and analyse information on a graph or chart to decide the appropriate information or mathematical operation to use to solve a problem.

Since 93% of the students completed the test, it is assumed that sufficient time was allocated for completion. The timed tests in addition, subtraction, multiplication, and division in Section II were not expected to be completed by all students, because these tests measured mastery of facts and not process skills. However, more than 25% of the students scored 100% on addition, 16% on subtraction, 13% on multiplication, and 7% on division.

Overall, the test results showed that Grade 3 students are learning very well the concepts and procedures as set out in the Grade 3 Mathematics curriculum.

SECTION 4
GRADE 6 SCIENCE

GENERAL DESCRIPTION

The Grade 6 Science Achievement Test consisted of 60 multiple-choice questions. The time allotted for writing the test was 60 minutes.

The information presented in this section is based on the results achieved by 30 400 students.

SUMMARY OF RESULTS

RESULTS IN RELATION TO STANDARDS

Results show that 82.5% of students who wrote the test achieved the acceptable standard and 24.6% achieved the standard of excellence. These results were lower than the acceptable standard and were higher than the standard of excellence. The acceptable standard and the standard of excellence were established by using a process for confirming standards (see Appendix C).

AVERAGE SCORE

The average total test score was 67.5%, with a standard deviation of 16.6. The average total test raw score was 40.5 marks out of a possible 60, with a standard deviation of 10.0.

CONTENT OF THE TEST

The Grade 6 Science Achievement Test was designed to reflect the *Grade 6 Science Curriculum Specifications* (revised May 1986) that were developed from the revised 1984 Science *Program of Studies*. The scope of the test was limited to curriculum objectives that could be efficiently measured on a paper and pencil test. As a result, questions on the test were drawn from the content of the two major components in the core program:

- Subject Matter
- Process Skills

The subject matter component consisted of questions associated with the major themes of science in Division II. The process skills component consisted of questions integrated with subject matter and questions independent of subject matter.

Questions on the Grade 6 Science Achievement Test measured student achievement at two cognitive levels:

- Knowledge – recognize or recall ideas, terminology, facts, conventions, methods of inquiry, principles, generalizations, theories, and concepts

- Comprehension and Application – demonstrate an understanding of the concepts and skills, and apply appropriate methods and ideas to a new situation

Table 4-1 presents the blueprint used to develop the Grade 6 Science Achievement Test. Classification of each question by component, subtest, and cognitive level is indicated in the table.

Table 4-1
Grade 6 Science
Achievement Test Blueprint

Subtest	Component			Cognitive Level		
	Process[1] Skills	Subject Matter	Number of Questions	Knowledge	Comprehension and Application	Number of Questions
Matter and Energy	*3, 4, 6, 7, 10, 11, 12, 14, 17, 19, 22*	*1, 2, 5, 8, 9, 13, 15, 16, 18, 20, 21*	22	*1, 2, 7, 8, 13, 16, 21*	*3, 4, 5, 6, 9, 10, 11, 12, 14, 15, 17, 18, 19, 20, 22*	22
Living Things and Environment	*25, 26, 27, 31, 33, 34, 35, 38, 39*	*23, 24, 28, 29, 30, 32, 36, 37, 40*	18	*23, 24, 32, 37*	*25, 26, 27, 28, 29, 30, 31, 33, 34, 35, 36, 38, 39, 40*	18
Earth, Space, and Time	*41, 43, 46*	*42, 44, 45*	6	*41, 44*	*42, 43, 45, 46*	6
Process Skills[2]	*47, 48, 49, 50, 51, 52, 53, 54, 55, 56, 57, 58, 59, 60*		14	*49, 51*	*47, 48, 50, 52, 53, 54, 55, 56, 57, 58, 59, 60*	14
TOTAL	37	23	60	15	45	60

[1] This column indicates the number of test questions in which process skills are integrated with subject matter.
[2] This row indicates the number of test questions in which process skills are independent of prescribed subject matter.

STUDENTS TESTED, ABSENT, AND EXEMPT

Table 4-2 presents the number and percentage distribution of students who wrote the Grade 6 Science Achievement Test, who were absent, and who were exempt. Results for students in French Immersion or Francophone programs will be reported separately to participating schools and jurisidictions.

Table 4-2
Grade 6 Science
Students Included in Provincial Results, Absentees, and Exemptions

Category	Number of Students	Percentage of Students
Students Included in Provincial Results	30 400	86.6
Students Absent	1 510	4.3
Students Exempt:	3 206	9.1
Special Needs	705	2.0
Not Taught Subject This Term	417	1.2
ESL Classes	289	0.8
Language of Instruction Not English*	1 746	5.0
Other (approved by Director)	49	0.1

*1 477 of these students were enrolled in French Immersion or Francophone programs and wrote the test in English or French. Results are being reported directly to schools and jurisdictions. These students were not necessarily representative; therefore, their results are not included in this provincial report. For further information, please contact the Student Evaluation Branch, Alberta Education.

RESULTS IN RELATION TO STANDARDS

Table 4-3 shows the percentage of students achieving the acceptable standard and the standard of excellence. These levels of performance were slightly lower than the acceptable standard and higher than the standard of excellence.

Table 4-3
Grade 6 Science
Percentage of Students Achieving Standards

Level of Standard	Raw Score Representing Standard	Percentage of Students Achieving At or Above Standard	
		Expectation	Actual
Total Test (Max. Possible Score = 60)			
Acceptable Standard	31	85.0	82.5
Standard of Excellence	49	15.0	24.6
Process Skills (Max. Possible Score = 37)			
Acceptable Standard	17	85.0	83.7
Standard of Excellence	30	15.0	22.4
Subject Matter (Max. Possible Score = 23)			
Acceptable Standard	13	85.0	85.4
Standard of Excellence	20	15.0	18.2

The numbers of students achieving the acceptable standard and the standard of excellence for each jurisdiction were analysed to determine whether jurisdictions were below expectations, meeting expectations, or above expectations. Jurisdictions classified as meeting expectations were those for which the difference between the actual number of students and the expected number of students at or above expectations was not statistically significant. A 95% confidence interval was used; this criterion means that differences are only reported when there is a 5% or smaller probability that a difference of that size could occur by chance.

The results are reported in Table 4-4. The percentages in the table are based on 231 jurisdictions (including private schools).

Table 4-4
Grade 6 Science
Percentage Distribution of Jurisdictions* Meeting Expectations

Level of Standard	Below Expectation	Meeting Expectation	Above Expectation
Total Test			
Acceptable Standard**	23.2	69.5	7.4
Standard of Excellence***	2.1	48.4	49.5
Process Skills			
Acceptable Standard	22.6	71.6	5.8
Standard of Excellence	2.6	59.5	37.9
Subject Matter			
Acceptable Standard	15.8	71.6	12.6
Standard of Excellence	1.6	34.7	63.7

*Jurisdictions with fewer than five students are excluded, as the statistical significance of the frequencies compared to the expectations cannot be calculated.

**Acceptable Standard: 85% of students are expected to achieve at or above the acceptable standard.

***Standard of Excellence: 15% of students are expected to achieve at or above the standard of excellence.

REPORTING CATEGORIES

Table 4-5 shows the total marks possible and the provincial raw score results for the reporting categories of the Grade 6 Science Achievement Test.

It is important to stress that the averages on the various reporting categories cannot be directly compared with one another. Rather, the results shown in Table 4-5 can best be used in conjunction with parallel tables in the jursidiction, school, and classroom reports. Variations in patterns of students' responses to questions can help to indicate strengths and weaknesses in local educational programs.

Table 4-5
Grade 6 Science
Raw Score Results by Reporting Category

Reporting Category	Total Marks Possible	Raw Score Average	Standard Deviation
Total Test	60	40.5	10.0
Major Component			
Process Skills	37	23.7	6.7
Subject Matter	23	16.8	3.9
Subtest			
Matter and Energy	22	15.5	4.0
Living Things and Environment	18	12.8	3.3
Earth, Space, and Time	6	4.1	1.3
Process Skills as Content	14	8.1	3.0
Cognitive Level			
Knowledge	15	10.7	2.7
Comprehension/Application	45	29.8	7.8

FREQUENCY DISTRIBUTION OF RAW SCORES

Table 4-6 presents the percentage of students who obtained each score (relative frequency) on the Grade 6 Science Achievement Test and the percentage of students who scored at or below each score (cumulative frequency).

Table 4-6
Grade 6 Science
Frequency Distribution of Raw Scores

Total Raw Score	Relative Frequency (%)	Cumulative Frequency (%)	Total Raw Score	Relative Frequency (%)	Cumulative Frequency (%)
0	0.0	0.0	31	2.2	19.6
1	0.0	0.0	32	2.6	22.2
2	0.0	0.0	33	2.6	24.9
3	0.0	0.0	34	2.6	27.5
4	0.0	0.0	35	2.9	30.4
5	0.0	0.0	36	3.1	33.6
6	0.0	0.0	37	3.2	36.8
7	0.0	0.0	38	3.0	39.8
8	0.0	0.0	39	3.4	43.2
9	0.0	0.1	40	3.3	46.5
10	0.0	0.1	41	3.5	50.0
11	0.1	0.1	42	3.7	53.7
12	0.0	0.2	43	3.9	57.6
13	0.1	0.3	44	3.6	61.2
14	0.2	0.4	45	3.6	64.7
15	0.2	0.7	46	3.8	68.5
16	0.3	0.9	47	3.5	72.0
17	0.4	1.3	48	3.4	75.4
18	0.6	1.9	49	3.6	78.9
19	0.6	2.5	50	3.3	82.3
20	0.8	3.2	51	3.5	85.8
21	0.8	4.0	52	3.0	88.7
22	0.9	4.9	53	2.6	91.4
23	1.0	6.0	54	2.4	93.7
24	1.2	7.2	55	2.1	95.8
25	1.4	8.6	56	1.6	97.4
26	1.4	10.0	57	1.3	98.7
27	1.6	11.6	58	0.7	99.5
28	1.7	13.3	59	0.4	99.9
29	2.0	15.3	60	0.1	100.0
30	2.2	17.5			

PERCENTAGE OF STUDENTS CHOOSING EACH ALTERNATIVE

Table 4-7 shows the percentage of students who chose each alternative (A, B, C, and D) for each multiple-choice question. The correct response (key) for each question is also identified.

The results shown in Table 4-7 can best be used in conjunction with the parallel tables in the jurisdiction and school reports. Variations in patterns of students' responses to questions can help to indicate strengths and weaknesses in local educational programs.

Table 4-7
Grade 6 Science
Results for Individual Multiple-Choice Questions*

Item	Key	Distribution of Responses (%)				Item	Key	Distribution of Responses (%)			
		A	B	C	D			A	B	C	D
1	D	9.9	10.2	4.3	75.5	31	D	16.3	7.5	20.3	55.8
2	C	1.0	3.7	81.2	14.0	32	B	7.7	77.1	7.7	7.3
3	D	16.2	14.5	17.5	51.3	33	D	25.8	4.6	6.5	62.9
4	C	2.4	12.2	80.9	4.4	34	B	7.0	77.0	4.8	11.1
5	B	16.8	69.4	5.3	8.4	35	D	13.2	4.3	4.4	77.9
6	D	11.5	6.1	7.4	74.9	36	A	86.1	5.7	4.0	4.1
7	C	3.1	10.9	55.5	30.4	37	A	76.9	5.6	10.2	7.1
8	D	4.4	7.5	2.0	85.9	38	A	55.8	18.6	13.7	11.8
9	A	57.7	36.2	4.0	2.0	39	B	7.8	72.6	14.4	5.1
10	C	9.2	10.5	66.1	14.1	40	A	84.5	4.6	33.3	7.5
11	C	5.1	4.4	78.1	12.2	41	D	10.5	8.5	29.9	54.6
12	A	69.1	9.8	5.2	15.8	42	D	28.3	6.3	3.6	61.5
13	C	2.3	7.7	84.8	5.1	43	B	3.4	89.3	4.4	2.7
14	D	5.7	7.0	10.2	76.9	44	A	72.7	16.1	6.5	4.5
15	B	6.4	84.6	3.2	5.8	45	A	54.1	10.9	18.4	16.3
16	A	54.5	10.3	13.9	21.2	46	D	6.9	10.0	3.5	79.4
17	C	8.6	12.6	63.0	15.5	47	B	16.6	43.7	18.6	20.4
18	C	5.4	8.9	69.9	15.8	48	A	76.9	9.4	8.8	4.5
19	B	14.7	57.4	9.1	18.7	49	C	6.7	15.6	64.3	12.9
20	C	8.5	9.1	69.5	12.8	50	C	7.0	8.7	57.0	26.8
21	B	3.6	80.9	9.2	6.2	51	A	65.3	12.9	11.3	9.9
22	C	4.0	6.0	64.5	25.4	52	B	17.2	65.3	10.6	6.2
23	D	8.6	5.3	11.9	74.0	53	B	6.0	64.8	22.7	5.8
24	C	7.5	14.5	66.5	11.5	54	A	66.9	13.1	13.4	5.9
25	D	5.2	12.4	13.0	69.3	55	C	5.7	6.5	77.7	9.1
26	C	15.8	14.2	51.6	18.2	56	B	11.4	34.0	9.3	44.0
27	D	7.1	10.8	8.8	73.2	57	D	13.7	27.8	8.6	48.7
28	C	4.2	21.7	63.6	10.3	58	B	13.1	50.5	22.2	12.6
29	A	73.2	8.9	10.3	7.5	59	A	50.5	21.0	20.5	6.4
30	B	3.4	79.1	11.0	6.4	60	A	46.2	20.3	22.4	9.5

* The sum of the percentages for each question may be less than 100% because the No Response category is not included. This category does not exceed 1.6% for any one of those questions.

GRADE 6 SCIENCE EXAMINERS' REMARKS

Grade 6 Science teachers who were chosen to confirm standards for the 1990 Grade 6 Science Achievement Test felt that the test reflected the philosophy and program objectives of the Division II Science Program. Teachers also agreed that the shift from process skills independent of prescribed subject matter to questions that integrated process skills with the subject matter of Division II Science was favorable. This approach required students to think and apply their scientific knowledge and understanding to analyse the wide variety of real-life situations presented in the test. Results from confirming standards (Table 4-3), indicate that in 1990, 82.5% of students met the standard at the acceptable level of performance. Although this result was slightly lower than expected, teachers felt that students performed well.

Standards set by 1990 standard setters for the 1986 Grade 6 Science Achievement Test indicate that 82.2% of the students would have met the acceptable standard in 1986. When compared to the 1990 standard, in essence, the number of students achieving the acceptable standard has not changed appreciably from 1986 to 1990. Also, in 1990, 24.6% of students met or exceeded the standard of excellence. In comparison to the standards set in 1990 for the 1986 test, slightly fewer, 23.5%, of the students would have met or exceeded the standard of excellence.

Further analysis indicates that Grade 6 Science students achieving the standard of excellence know and can do more than students achieving the acceptable standard of performance.

Students at the acceptable level understood that when a piece of metal was placed across a gap in an open electrical circuit, the circuit would close. Given a simple closed circuit, including a battery, bulb, and switch, students could infer that electrical energy was being changed to light energy. These students also knew that when a ray of light was directed upon a mirror, the ray would reflect at the mirror's surface. They were able to predict that the angle between the incoming ray and the mirror would be the same as that between the reflected ray and the mirror. When light was split into the colors of the light spectrum (or rainbow), students understood that this was a result of the refraction of light through a medium such as water. Students knew that sound generated by a musical instrument could depend upon the tightness of the string, the size of the instrument, and the material from which it is made. These students understood that nuclear energy produces waste material that must be stored very carefully. They also knew that environmental factors such as light and space affect the growth of plants, and they understood that, structurally, animals have adapted to their environment; i.e., birds that run have thick, padded feet. Students were able to infer that river water was least polluted the closer it was to its source. In addition, students could interpret pictorial data and correctly identify the best graphical representation of the data.

Students performing at the acceptable level had great difficulty with the more abstract concepts and higher cognitive process skills. These students had a good knowledge base to work from and were proficient with process skills at lower cognitive levels.

Students who performed at the level of excellence exceeded all the standards achieved by students at the acceptable level of performance. In addition, students performing at the level of excellence knew that the sun is a nonpolluting and renewable energy resource. They also knew that coal, natural gas, oil, and nuclear energy are all nonrenewable sources of energy. Students understood that the sun is the source of energy for both the water cycle and food chains. They were able to apply their knowledge of energy conservation concepts when asked to identify energy that is either conserved or used in a wasteful manner. These students knew that heat causes gases to expand and water to evaporate more quickly as temperature is increased, and that the intensity of light decreases as the distance from the source increases. When shown new data presented in a table, students could transfer their understanding that light travels faster than sound to a new situation that relates to their everyday life.

Students who performed at the level of excellence could identify seaweed as a producer in an ocean ecosystem, they knew that water is a nonliving part of any ecosystem, they could identify predator-prey relationships within specific food chains, and they recognized that reproduction is an essential function to the survival of all forms of life.

These students knew the components of an electrical circuit and could identify the electrical flow within a circuit representative of the interpretation of a given set of data. They could interpret numerical, descriptive, and graphical data needed to distinguish between correct and incorrect analyses, applications, and explanations of scientific concepts at the Grade 6 level. In addition, they were able to recognize weaknesses and strengths in experimental design, including the identification of appropriate dependent (responding) and independent (manipulated) variables.

Results from confirming standards indicated that students performing at the level of excellence experienced much success with their understanding and application of science concepts and skills in Grade 6.

Although overall achievement appears to be relatively unchanged from 1986 to 1990, the percentage of students performing at the acceptable level is lower than expected. This indicates that student learning in Grade 6 Science continues to need improvement.

SECTION 5
GRADE 9 ENGLISH LANGUAGE ARTS

GENERAL DESCRIPTION

The Grade 9 English Language Arts Achievement Test was in two parts. Part A: Written Response was a two-hour test consisting of a writing assignment based on the theme developed by a selection of literature. This format was designed to reflect the writing process. Part B: Reading was a one-and-a-half-hour reading test consisting of 65 multiple-choice questions based on reading selections from fiction, nonfiction, poetry, and drama. Each part was worth 50% of the total test mark.

The test was designed to reflect the Grade 9 Language Arts curriculum specifications that have been developed from the *Program of Studies for Junior High Language Arts, 1987*. The scope of the Grade 9 English Language Arts Achievement Test was limited to the writing and the reading components of the program.

The information presented in this section is based on the results achieved by 28 857 students.

SUMMARY OF RESULTS

RESULTS IN RELATION TO STANDARDS

Results show that 82.9% of students who wrote the test achieved the acceptable standard and 10.8% achieved the standard of excellence. These results were below standards. The acceptable standard and the standard of excellence were established by using a process for confirming standards (see Appendix C).

AVERAGE SCORE

The average total score for the test was 61.5%, with a standard deviation of 12.5. The average raw score for Part A: Written Response was 16.0 marks out of a possible 25, with a standard deviation of 3.6. For Part B: Reading, the average raw score was 38.4 marks out of a possible 65, with a standard deviation of 9.8.

CONTENT OF THE TEST

The Part A: Written Response booklet included pages for planning and drafting and for revised work. The writing assignment was based on the poem "If" that was read by the student. The assignment set a specific writing task but allowed the student to use imagination and background experience to develop a response. Papers were scored for Content, Organization, Sentence Structure, Vocabulary, and Conventions.

Part B: Reading consisted of eight literature selections, an advertisement, and two cartoons. Reading selections were chosen to challenge students based on the expectations of the *Program of Studies* and to reflect the interests of Grade 9 students. Every effort was made to include Canadian material on the test. All selections passed a Tolerance and Understanding Committee review to ensure the appropriateness of the literature selected.

ACHIEVEMENT TEST BLUEPRINT

Each question was classified in two ways: according to the thinking (process) skills demanded by the question and according to the curricular content area being tested. Consideration of thinking processes when developing a test ensures that students will use a variety of skills when answering questions.

Questions listed under Literal Understanding were designed to test the skills of recall and recognition. Those listed under Judgment asked the student to select the BEST answer; in such questions, each alternative had a measure of truth. Questions under Inferential Understanding required the student to use background experience as well as analysis and interpretation skills.

Table 5-1 presents the blueprint used to develop Part B: Reading of the Grade 9 English Language Arts Achievement Test. Classification of each question by reporting category is indicated in the table.

Table 5-1
Grade 9 English Language Arts
Part B: Reading
Achievement Test Blueprint

Question Type by Course Content	Question Type by Cognitive Level			Number of Questions
	Literal Understanding	Judgment	Inferential Understanding	
1. Attending to Details	*17, 43*	*9, 24, 25, 27, 33, 50*	*3, 5, 7, 13, 15, 16, 18, 22, 37, 48, 51, 53, 54, 57, 60, 63*	24
2. Identifying the Organization of Ideas	*2, 42*	*12, 31, 32, 58, 59*	*6, 19, 30, 36, 61*	12
3. Associating Meanings	*10, 14*	*1, 34, 45*	*8, 23, 26, 35, 44, 46, 52*	12
4. Synthesizing Ideas		*11, 21, 29, 40, 41, 49, 56, 62*	*4, 20, 28, 38, 39, 47, 55, 64, 65*	17
Number of Questions	6	22	37	65

STUDENTS TESTED, ABSENT, AND EXEMPT

Table 5-2 presents the number and percentage distribution of students who wrote the Grade 9 English Language Arts Achievement Test, who were absent, or who were exempt. Results for students in French Immersion or Francophone programs who wrote the Grade 9 French language arts achievement test will be reported separately to participating schools and jurisdictions.

Table 5-2
Grade 9 English Language Arts
Students Included in Provincial Results, Absentees, and Exemptions

Category	Number of Students	Percentage of Students
Students Included in Provincial Results	28 857	90.7
Students Absent	1 619	5.1
Students Exempt:	1 338	4.2
Special Needs	890	2.8
Not Taught Subject This Term	156	0.5
ESL Classes	244	0.8
Other (approved by Director)	48	0.2

RESULTS FOR THE TOTAL TEST

When the total test score for students was calculated, Part A: Written Response and Part B: Reading were given equal weighting. A summary score for Part A: Written Response was calculated by adding up the scores for each of the five written-response scales, thus giving each scale equal weighting in the summary score.

RESULTS IN RELATION TO STANDARDS

Table 5-3 shows the percentages of students achieving the acceptable standard and the standard of excellence for the total test, for Part A: Written Response, and for Part B: Reading.

Levels of performance on the overall test were lower than expected. This was due largely to results for Part B. Only 74.5% of students met the acceptable standard. This is more than 10% below expectations. Note, however, that these results are comparable to 1986 (see Table 8-6).

Table 5-3
Grade 9 English Language Arts
Percentage of Students Achieving Standards

Reporting Category and Level of Standard	Raw Score Representing Standard	Percentage of Students Achieving At or Above Standard	
		Expectation	Actual
Total Test			
(Maximum Possible Score = 100)			
Acceptable Standard	50	85.0	82.9
Standard of Excellence	78	15.0	10.8
Part A: Written Response			
(Maximum Possible Score = 25)			
Acceptable Standard	13	85.0	86.7
Standard of Excellence	20	15.0	15.8
Part B: Reading			
(Maximum Possible Score = 65)			
Acceptable Standard	32	85.0	74.5
Standard of Excellence	50	15.0	13.8

The numbers of students achieving the acceptable standard and the standard of excellence for each jurisdiction were analysed to determine whether jurisdictions were below expectations, meeting expectations, or above expectations. Jurisdictions classified as meeting expectations were those for which the difference between the actual number of students and the expected number of students at or above expectations was not statistically significant. A 95% confidence interval was used; this criterion means that differences are only reported when there is a 5% or smaller probability that a difference of that size could occur by chance.

The results are reported in Table 5-4. The percentages in the table are based on 184 jurisdictions (including private schools). An additional 39 jurisdictions were too small to give reliable results.

Table 5-4
Grade 9 English Language Arts
Percentage Distribution of Jurisdictions* Meeting Expectations

Reporting Category and Level of Standard	Below Expectation	Meeting Expectation	Above Expectation
Total Test			
Acceptable Standard**	21.7	73.4	4.9
Standard of Excellence***	23.9	73.9	2.2
Part A: Written Response			
Acceptable Standard	10.3	81.0	8.7
Standard of Excellence	4.3	82.1	13.6
Part B: Reading			
Acceptable Standard	53.8	45.1	1.1
Standard of Excellence	6.5	87.5	6.0

*Jurisdictions with fewer than five students are excluded, as the statistical significance of the frequencies compared to the expectations cannot be calculated.
**Acceptable Standard: 85% of students are expected to achieve at or above the acceptable standard.
***Standard of Excellence: 15% of students are expected to achieve at or above the standard of excellence.

Table 5-5 shows the percentage of students who obtained each total test score (relative frequency) and the percentage of students who scored at or below each total test score (cumulative frequency).

Table 5-5
Grade 9 English Language Arts
Frequency Distribution of Raw Scores

Total Raw Score	Relative Frequency (%)	Cumulative Frequency (%)	Total Raw Score	Relative Frequency (%)	Cumulative Frequency (%)
0	0.0	0.0	51	2.1	21.5
1	0.0	0.0	52	2.6	24.1
2	0.0	0.0	53	2.4	26.5
3	0.0	0.0	54	2.8	39.3
4	0.0	0.0	55	2.7	32.0
5	0.0	0.0	56	3.0	35.0
6	0.0	0.0	57	2.7	37.7
7	0.0	0.0	58	3.4	41.1
8	0.0	0.0	59	2.7	43.8
9	0.0	0.0	60	3.4	47.2
10	0.0	0.0	61	2.8	50.0
11	0.0	0.0	62	3.4	53.4
12	0.0	0.0	63	2.8	56.2
13	0.0	0.0	64	3.3	59.5
14	0.0	0.0	65	2.0	62.5
15	0.0	0.0	66	3.1	65.6
16	0.0	0.1	67	2.7	68.3
17	0.0	0.1	68	2.8	71.1
18	0.0	0.1	69	2.5	73.6
19	0.0	0.1	70	2.6	76.2
20	0.0	0.1	71	2.2	78.4
21	0.0	0.1	72	2.4	80.8
22	0.0	0.1	73	1.9	82.7
23	0.0	0.2	74	1.9	84.6
24	0.0	0.2	75	1.6	86.2
25	0.0	0.2	76	1.6	87.9
26	0.1	0.3	77	1.3	89.2
27	0.1	0.3	78	1.6	90.8
28	0.1	0.4	79	1.1	91.9
29	0.1	0.5	80	1.2	93.1
30	0.1	0.6	81	1.0	94.1
31	0.1	0.7	82	1.1	95.1
32	0.2	0.9	83	0.7	95.9
33	0.2	1.1	84	0.8	96.6
34	0.3	1.4	85	0.6	97.3
35	0.3	1.7	86	0.7	97.9
36	0.4	2.1	87	0.3	98.2
37	0.4	2.5	88	0.4	98.7
38	0.7	3.1	89	0.3	99.0
39	0.6	3.7	90	0.3	99.3
40	0.7	4.4	91	0.2	99.5
41	0.8	5.3	92	0.1	99.7
42	1.0	6.3	93	0.1	99.9
43	1.0	7.2	94	0.1	99.9
44	1.4	8.7	95	0.1	100.0
45	1.4	10.1	96	0.0	100.0
46	1.8	11.9	97	0.0	100.0
47	1.5	13.4	98	0.0	100.0
48	1.9	15.3	99	0.0	100.0
49	1.8	17.1	100	0.0	100.0
50	2.3	19.4			

RESULTS FOR PART A: WRITTEN RESPONSE

Raw scores were calculated by adding the marks earned for each of the five 5-point reporting categories.

RESULTS IN RELATION TO STANDARDS

For Part A: Written Response, as shown in Table 5-3, the standard established was such that in order to meet

- the acceptable standard, students had to achieve a raw score of 13 out of 25
- the standard of excellence, students had to achieve a raw score of 20 out of 25.

Based on these standards, the results revealed that

- 86.7% of students performed at or above the acceptable standard, and
- 15.8% of students performed at or above the standard of excellence.

The level of performance was slightly above the acceptable standard and at the standard of excellence.

AVERAGE SCORE

The average raw score for Part A: Written Response was 16.0 marks out of a possible 25, with a standard deviation of 3.6.

Table 5-6 shows the percentage of students who obtained each score (relative frequency) on Part A: Written Response and the percentage of students who scored at or below each score (cumulative frequency).

Results for Part A: Written Response are most clearly understood in the context of the assignment to which students responded and in the context of the scoring descriptors. Complete scoring guides are available from the Student Evaluation Branch, Alberta Education.

All schools should have extra copies of the Part A: Written Response test to use in conjunction with information provided in this *Provincial Report.*

Table 5-6
Grade 9 English Language Arts
Part A: Written Response
Frequency Distribution of Raw Scores

Total Raw Score	Relative Frequency (%)	Cumulative Frequency (%)	Total Raw Score	Relative Frequency (%)	Cumulative Frequency (%)
0	0.2	0.2	15	14.5	48.8
5	0.3	0.5	16	11.0	59.8
6	0.2	0.7	17	10.2	70.0
7	0.3	1.0	18	8.1	78.2
8	0.6	1.6	19	6.1	84.2
9	0.8	2.4	20	5.1	89.4
10	2.0	4.4	21	3.2	92.6
11	3.0	7.5	22	2.2	94.8
12	5.9	13.3	23	2.1	96.9
13	9.5	22.8	24	1.5	98.4
14	11.5	34.4	25	1.6	100.0

SCORING RELIABILITY

Although the papers were scored on a one-marker system, 297 randomly selected papers were re-marked so that a second set of scores was available to confirm scoring consistency. Of the scores awarded on the second reading, 90.3% were identical to the original score on the same scale or varied by only one point. It is important to note that the one-marker system produces results that are reliable for groups of 25 or more students. Achievement test scores are not intended to be reliable for individual students. The results outlined in Table 5-7 are best considered in terms of the percentage of students that markers judged to have presented work that was 3 (Satisfactory) or better for any reporting category.

It is possible to draw conclusions about local program strengths and weaknesses by comparing local percentages of 3 (Satisfactory) or better scores on each reporting category with the provincial averages.

Students do better on some dimensions of the task than on others (see Examiners' Remarks, page 42).

Table 5-7
Grade 9 English Language Arts
Part A: Written Response
Percentage Distribution of Scores by Reporting Category

Score (Scale Points)	Reporting Category				
	Content	Organization	Sentence Structure	Vocabulary	Conventions
5 (Excellent)	6.4	6.8	5.5	5.1	8.2
4 (Proficient)	26.3	26.5	24.6	21.7	31.3
3 (Satisfactory)	49.1	47.3	50.6	62.1	41.2
2 (Limited)	15.7	17.4	17.2	10.1	17.1
1 (Poor)	2.2	1.7	1.8	0.8	1.9
INS (Insufficient or No Response)	0.2	0.2	0.2	0.2	0.2

RESULTS FOR PART B: READING

Since over 99% of students writing completed Part B: Reading, it was concluded that sufficient time was allotted for writing the test.

RESULTS IN RELATION TO STANDARDS

For Part B: Reading, as shown in Table 5-3, the standard established was such that in order to meet

- the acceptable standard, students had to achieve a raw score of 32 out of 65
- the standard of excellence, students had to achieve a raw score of 50 out of 65.

Based on these standards, the results revealed that

- 74.5% of students performed at or above the acceptable standard, and
- 13.8% of students performed at or above the standard of excellence.

The level of performance was below the acceptable standard and at the standard of excellence.

AVERAGE SCORE

Provincial summary results for Part B: Reading were as follows:

- Average – 38.4 marks out of a possible 65
- Standard Deviation – 9.8

Raw score averages for each reporting category and for Part B: Reading as a whole are presented in Table 5-8. Raw score averages were computed and rounded to one decimal.

Although levels of performance in the different reporting categories appear to show some variation, caution is advised when comparing them. The sets of questions that make up each category were not selected to be equal in average level of difficulty; therefore, differences may be due to variations in question difficulty rather than in student performance. The raw score averages can be used, however, in combination with jurisdiction and school results to detect patterns of relative strength or weakness in achievement in each of the categories.

Table 5-8
Grade 9 English Language Arts
Part B: Reading
Raw Score Results by Reporting Category

Reporting Category	Number of Questions	Raw Score Average	Standard Deviation
Total Part B: Reading	65	38.1	9.8
Attending to Details	24	14.0	3.9
Identifying the Organization of Ideas	12	7.6	2.2
Associating Meanings	12	7.1	2.4
Synthesizing Ideas	17	9.8	3.0
Literal Understanding	6	4.0	1.4
Judgment	22	11.8	3.6
Inferential Understanding	37	22.6	6.0

Table 5-9 presents the percentage of students who obtained each score (relative frequency) on Part B: Reading and the percentage of students who scored at or below each score (cumulative frequency).

Table 5-9
Grade 9 English Language Arts
Part B: Reading
Frequency Distribution of Raw Scores

Total Raw Score	Relative Frequency (%)	Cumulative Frequency (%)	Total Raw Score	Relative Frequency (%)	Cumulative Frequency (%)
0	0.0	0.0	33	3.0	31.4
1	0.0	0.0	34	3.4	34.8
2	0.0	0.0	35	3.3	38.0
3	0.0	0.0	36	3.2	41.2
4	0.0	0.0	37	3.2	44.5
5	0.0	0.0	38	3.2	47.7
6	0.0	0.0	39	3.4	51.1
7	0.0	0.0	40	3.6	54.7
8	0.0	0.0	41	3.8	58.5
9	0.0	0.0	42	3.6	62.2
10	0.0	0.0	43	3.6	65.8
11	0.0	0.1	44	3.8	69.6
12	0.1	0.2	45	3.4	73.0
13	0.1	0.3	46	3.6	76.6
14	0.2	0.5	47	3.2	79.8
15	0.3	0.7	48	3.4	83.2
16	0.5	1.2	49	3.0	86.2
17	0.5	1.7	50	2.7	88.9
18	0.7	2.4	51	2.5	91.5
19	0.8	3.2	52	2.2	93.6
20	0.9	4.1	53	1.8	95.5
21	1.1	5.1	54	1.4	96.9
22	1.3	6.5	55	1.2	98.1
23	1.5	7.9	56	0.8	98.9
24	1.6	9.6	57	0.5	99.4
25	1.9	11.4	58	0.3	99.7
26	2.0	13.4	59	0.2	99.9
27	2.2	15.5	60	0.1	99.9
28	2.1	17.7	61	0.0	100.0
29	2.4	20.2	62	0.0	100.0
30	2.6	22.8	63	0.0	100.0
31	2.7	25.5	64	0.0	100.0
32	2.9	28.4	65	0.0	100.0

PERCENTAGE OF STUDENTS CHOOSING EACH ALTERNATIVE

Table 5-10 presents the percentage of students who chose each alternative (A, B, C, and D) for each multiple-choice question on Part B: Reading. The correct response (key) for each question is also identified.

The results shown in Table 5-10 can best be used in conjunction with results presented in jurisdiction and school reports in order to interpret strengths and weaknesses of local programs.

Table 5-10
Grade 9 English Language Arts
Part B: Reading
Results for Individual Multiple-Choice Questions*

Item	Key	Distribution of Responses (%)				Item	Key	Distribution of Responses (%)			
		A	B	C	D			A	B	C	D
1	B	40.9	38.6	12.5	7.9	34	B	17.1	48.0	10.0	24.8
2	C	4.9	5.4	75.0	14.6	35	C	5.2	8.8	82.2	3.6
3	B	18.4	70.7	5.0	5.7	36	D	14.1	9.3	5.2	71.4
4	D	7.1	2.8	17.4	72.7	37	C	20.4	13.7	50.5	15.4
5	A	44.7	15.3	8.6	31.3	38	A	66.5	15.7	13.1	4.5
6	C	1.4	7.9	71.1	19.5	39	D	11.7	15.6	22.8	49.8
7	C	15.3	6.6	53.9	24.1	40	A	54.1	12.9	14.2	18.8
8	A	68.3	5.7	10.5	15.3	41	C	13.8	12.9	36.5	36.8
9	D	46.1	5.9	30.6	17.3	42	C	12.6	17.8	50.0	19.5
10	B	18.3	66.5	9.2	5.9	43	B	10.4	47.3	10.2	31.9
11	C	21.1	8.8	51.0	18.8	44	D	13.2	8.9	5.1	72.7
12	B	6.1	48.3	6.9	38.7	45	D	20.9	7.3	14.2	57.3
13	A	51.3	9.1	9.2	30.2	46	A	25.3	12.5	31.3	30.8
14	B	3.7	88.8	4.4	3.1	47	A	52.4	11.8	26.6	9.1
15	D	7.8	3.4	5.1	83.6	48	D	12.7	13.7	32.0	41.4
16	D	19.4	9.3	8.8	62.4	49	D	21.0	15.0	14.1	49.8
17	B	10.1	74.1	12.2	3.6	50	C	24.7	5.7	58.4	10.9
18	C	7.3	6.1	80.1	6.5	51	B	10.6	68.1	8.6	12.4
19	C	24.9	15.6	34.9	24.3	52	A	47.4	24.9	18.0	9.6
20	A	64.7	8.3	10.4	16.5	53	D	8.8	11.8	19.8	59.4
21	A	50.7	10.9	15.1	23.2	54	C	7.0	8.6	66.8	17.4
22	D	5.6	8.5	40.3	45.5	55	C	9.3	8.1	73.7	8.6
23	A	51.4	14.3	14.2	20.0	56	D	29.7	17.8	15.6	36.7
24	D	22.4	4.2	5.2	68.1	57	D	7.3	6.9	7.6	77.9
25	C	6.5	25.6	62.8	5.0	58	B	12.5	74.3	5.8	7.0
26	D	8.3	19.3	11.2	61.2	59	D	9.4	10.2	9.5	70.6
27	B	7.5	42.8	23.9	25.6	60	A	57.8	14.2	20.5	7.0
28	A	64.8	6.5	12.8	15.9	61	C	10.4	10.2	72.6	6.5
29	B	30.5	40.7	5.3	23.4	62	C	12.9	6.9	70.5	9.1
30	A	40.4	13.7	28.9	16.9	63	B	21.5	57.7	6.8	13.5
31	C	6.2	7.5	80.1	6.1	64	D	2.5	6.6	7.9	82.5
32	D	12.0	6.2	10.6	71.1	65	B	7.1	59.1	4.2	29.0
33	B	26.9	53.7	8.8	10.4						

*The sum of the percentages for each question may be less than 100% because the No Response category is not included. This category does not exceed 0.6% for any one of these questions.

GRADE 9 ENGLISH LANGUAGE ARTS EXAMINERS' REMARKS

PART A: WRITTEN RESPONSE

On Part A of the test, a student is expected to establish a purpose for writing and to support the response with appropriate, relevant ideas and details that are organized in a discernible manner. The student is also expected to exhibit general control of sentence structure, vocabulary, and conventions.

On the 1990 test, 86.7% of the students achieved at or above the acceptable standard and 15.8% achieved the level of excellence. Comparable standards set in 1990 for the 1986 test indicate that 82.6% of students would have met or exceeded the acceptable standard in 1986 and 22.0% of students would have met or exceeded the standard of excellence.

Markers commented that most students were able to establish and sustain their responses to the writing assignment; there were very few unclear or poor responses. Students planned and organized their ideas coherently. In some cases, students needed to pay more attention to the development of purposeful, focused introductions and conclusions.

Students' selection of vocabulary was satisfactory. Words and expressions were usually used accurately; however, in most responses, general rather than specific vocabulary was chosen to describe ideas. Control over conventions (mechanics and grammatical construction) was evident in most papers, although some basic errors were noted.

Overall, these observations are confirmed when achievement levels for students who scored 3 (Satisfactory) or better in 1990 are compared with the 1986 figures. In all categories except Conventions, achievement levels in 1990 were higher than in 1986. This higher level of achievement indicates that students are developing good writing skills and, in this respect, the school programs delivered by teachers are effective.

Most markers expressed a very positive reaction to the scoring guide; many reported that they use the guide to evaluate writing in their classrooms.

PART B: READING

In 1990, 74.5% of students achieved at or above the acceptable standard of achievement and 13.8% of students achieved a level of excellence. Comparable standards set in 1990 for the 1986 test indicate that 77.9% of students would have met the acceptable standard in 1986 and that 17.6% of students would have achieved a level of excellence.

The multiple-choice section of the test required students to read and understand different literary genres at the Grade 9 reading level. Results show that students are generally able to deal with details and ideas that are presented in a reading selection. Fewer students, however, are able to understand ideas, details, and relationships that are **implied** in a reading selection. Students have the most difficulty answering questions at the Judgment level, where they must evaluate the alternatives in the context of the reading selection in order to select the BEST answer.

Feedback from the 140 markers indicates that the reading test reflected the emphasis and philosophy of the *Program of Studies*. Many responded that the level of difficulty was higher in 1990 than in 1986. In part, this was because all questions in 1990 were based on passages of literature, whereas in 1986, the test contained 10 discrete questions from a 1978 Grade 9 Reading Achievement Test. In addition, the 1990 test included questions based on a drama selection and five questions based on visuals, to reflect changes in the curriculum.

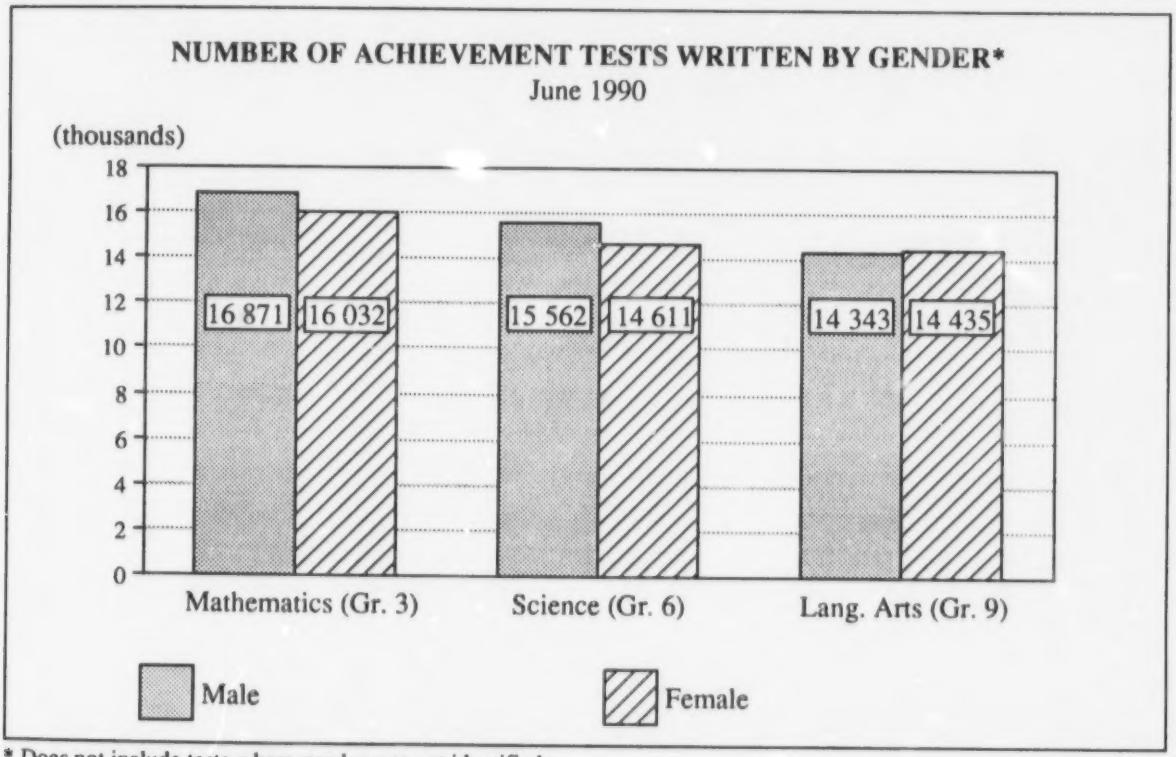
Results from our confirming-standards activity indicate that students are not achieving well on the reading section of the test. To raise the level of achievement, school programs should emphasize understanding implied meanings in reading selections. As well, instructional programs should address the difficulty students experience when they are required to critically evaluate the author's message.

SECTION 6
STUDENT ACHIEVEMENT BY GENDER

The figures and tables in this section of the report provide a breakdown by gender of the results achieved by students who wrote the June 1990 achievement tests.

This information is a descriptive report of male and female student achievement in Grade 3 Mathematics, Grade 6 Science, and Grade 9 English Language Arts. It is a report of *what* happened in the June 1990 Achievement Testing Program. The interpretation of this information – hypothesizing *why* results are as they are – requires thoughtful consideration of the numerous variables that contribute to achievement (see Section 2 of this report and Appendix A).

Figure 6-1



* Does not include tests where gender was not identified.

Figure 6-2

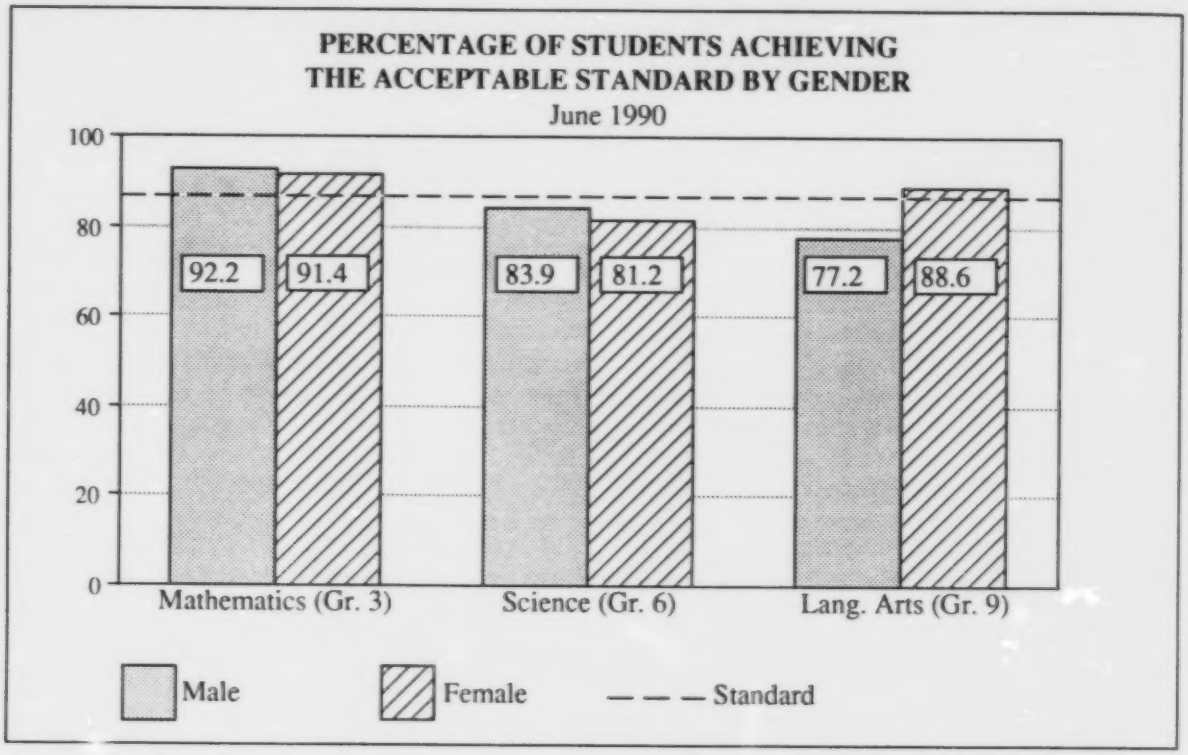


Figure 6-3

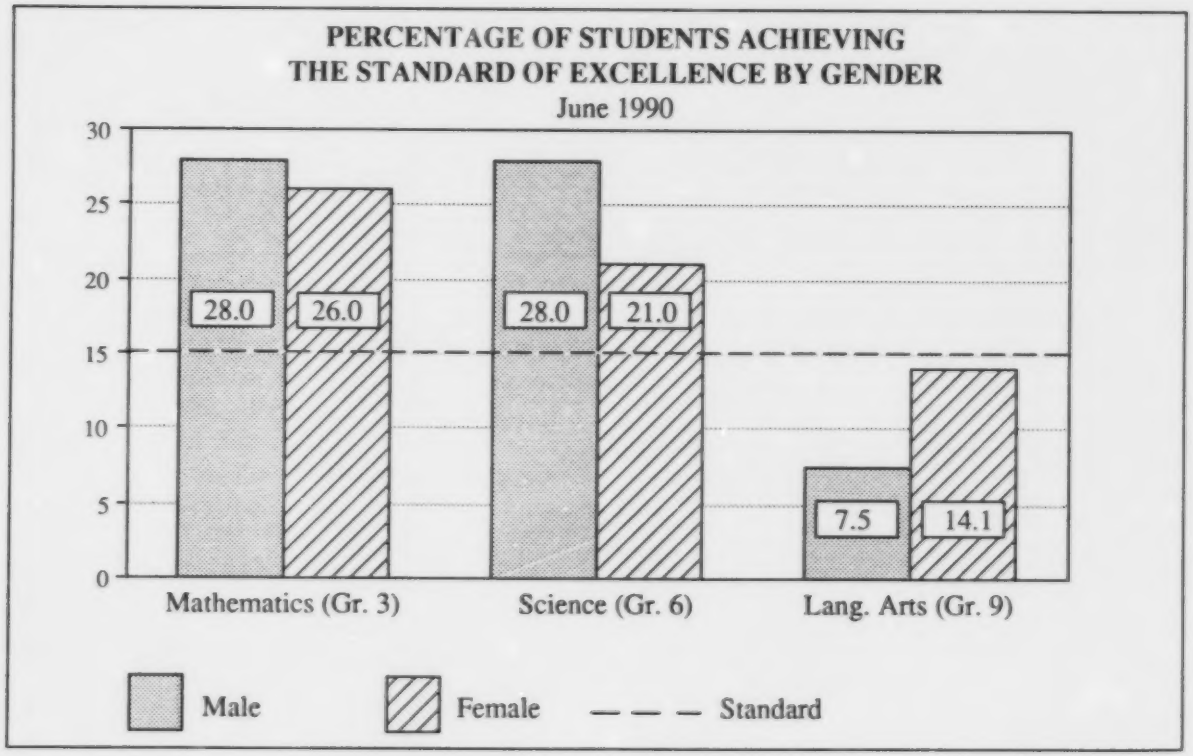


Table 6-1
Number and Percentage of Students Writing Achievement Tests by Gender

Subject	Number of Students	Percentage of Students
Grade 3 Mathematics *N*=33 349		
Male	16 871	50.6
Female	16 032	48.1
Incomplete data	446	1.3
Grade 6 Science *N*=30 400		
Male	15 562	51.2
Female	14 611	48.1
Incomplete data	227	0.7
Grade 9 English Language Arts *N*=28 857		
Male	14 343	49.7
Female	14 435	50.0
Incomplete data	79	0.3

Table 6-2
Achievement Tests
Average and Standard Deviation by Gender

Test	Total Score (%)		Multiple Choice (Raw Score)		Written Response (Raw Score)	
	Male	Female	Male	Female	Male	Female
Grade 3 Mathematics						
Average	70.7	69.7	Grade 3 Mathematics consisted of multiple-choice questions only.			
Standard Deviation	17.4	17.5				
Grade 6 Science						
Average	68.8	66.2	Grade 6 Science consisted of multiple-choice questions only.			
Standard Deviation	16.8	16.3				
Grade 9 English Language Arts			(Max. Possible=65)		(Max. Possible=25)	
Average	58.9	64.1	36.9	39.9	15.2	16.7
Standard Deviation	12.5	12.0	10.0	9.5	3.5	3.4

SECTION 7
STUDENT ACHIEVEMENT BY AGE

Age-related information was collected for the first time in 1990. The figures and tables in this section of the report provide a breakdown by age of the results achieved by students who wrote the June 1990 achievement tests.

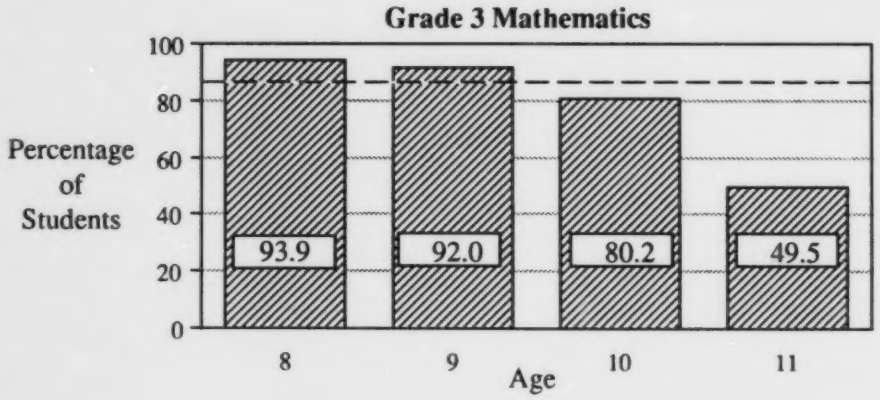
This information is a descriptive report of age-related student achievement in Grade 3 Mathematics, Grade 6 Science, and Grade 9 English Language Arts. It is a report of *what* happened in the June 1990 Achievement Testing Program. The interpretation of this information – hypothesizing *why* results are as they are – requires thoughtful consideration of the numerous variables that contribute to achievement (see Section 2 of this report and Appendix A). Caution: one must not assume that these results apply to students of the same age in other grades.

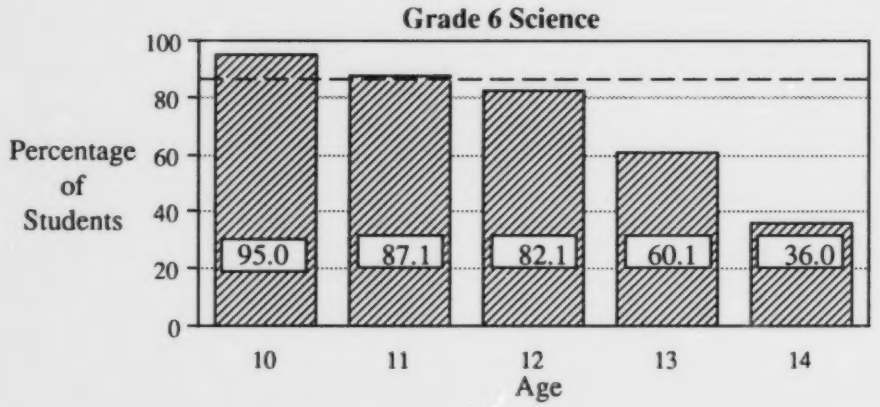
Table 7-1
Number of Achievement Tests Written by Age

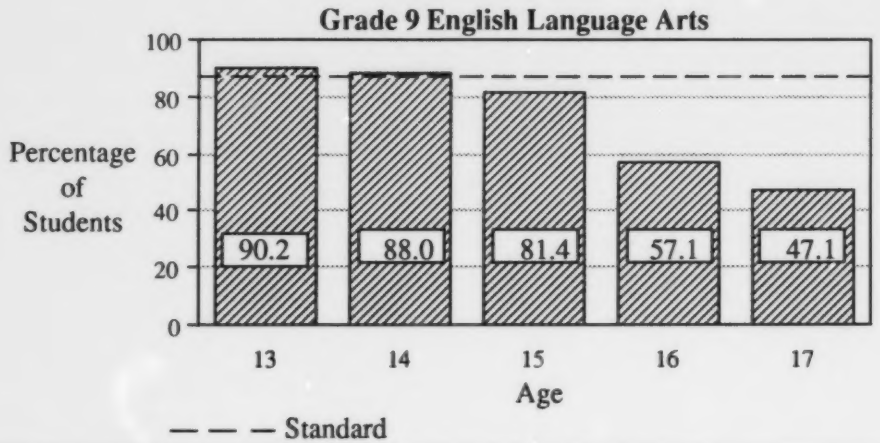
Age (years)	Grade 3 Mathematics		Grade 6 Science		Grade 9 English Language Arts	
	Number	Percentage	Number	Percentage	Number	Percentage
6	1	0.0	—	—	—	—
7	25	0.1	—	—	—	—
8	14 215	42.6	—	—	—	—
9	15 955	47.9	—	—	—	—
10	1 811	5.4	60	0.2	—	—
11	97	0.3	13 764	45.3	—	—
12	14	0.0	14 079	46.3	—	—
13	3	0.0	1 969	6.5	82	0.3
14	1	0.0	139	0.5	13 856	48.0
15	—	—	13	0.0	12 727	44.1
16	—	—	—	—	1 681	5.8
17	—	—	—	—	102	0.4
18	—	—	—	—	11	0.0
19	—	—	—	—	2	0.0
Incomplete Data	1 227	3.7	376	1.2	396	1.4
Total	33 349	100.0	30 400	100.0	28 857	100.0

Figure 7-1

PERCENTAGE OF STUDENTS ACHIEVING THE ACCEPTABLE STANDARD BY AGE*
June 1990



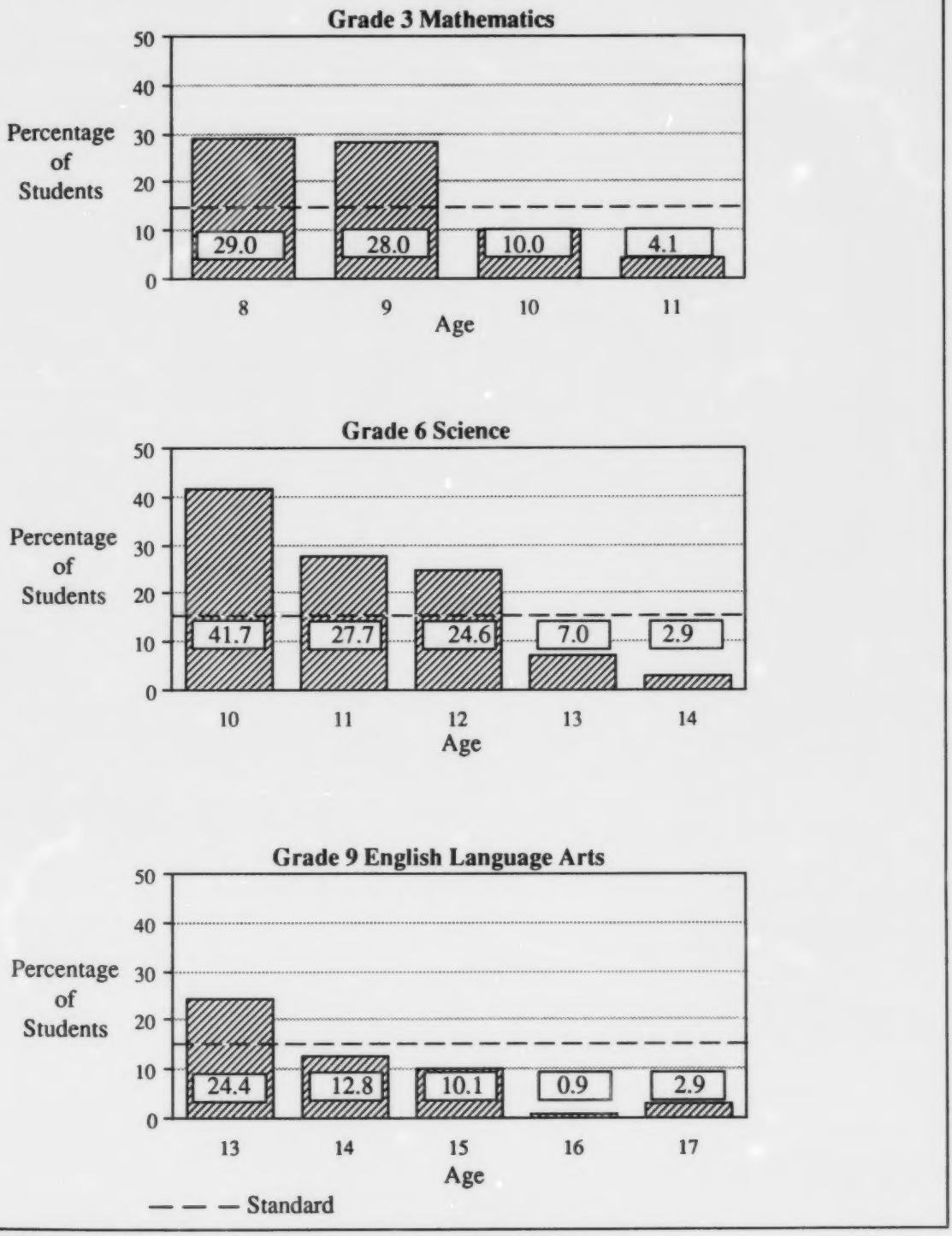




*Results for groups of fewer than 50 students are not shown on these graphs.

Figure 7-2

PERCENTAGE OF STUDENTS ACHIEVING THE STANDARD OF EXCELLENCE BY AGE*
June 1990



*Results for groups of fewer than 50 students are not shown on these graphs.

Table 7-2
Achievement Tests
Average and Standard Deviation by Age**

Achievement Test	Age	Students Writing		Average (%)	Standard Deviation (%)
		Number	Percentage		
Grade 3 Mathematics	6	1	0.0	—*	—
	7	25	0.1	—*	—
	8	14 215	42.6	71.7	16.5
	9	15 955	47.9	70.5	17.5
	10	1 811	5.4	59.2	18.2
	11	97	0.3	46.6	20.7
	12	14	0.0	—*	—
	13	3	0.0	—*	—
	14	1	0.0	—*	—
	Incomplete Data	1 227	3.7	—	—
Grade 6 Science	10	60	0.2	75.1	15.4
	11	13 764	45.3	69.9	15.5
	12	14 079	46.3	67.3	16.7
	13	1 969	6.5	55.8	16.5
	14	139	0.5	45.9	16.5
	15	13	0.0	—*	—
	Incomplete Data	376	1.2	—	—
Grade 9 English Language Arts	13	82	0.3	67.1	13.3
	14	13 856	48.0	63.5	11.8
	15	12 727	44.1	60.8	12.6
	16	1 681	5.8	51.7	11.0
	17	102	0.4	48.0	13.1
	18	11	0.0	—*	—
	19	2	0.0	—*	—
	Incomplete Data	396	1.4	—	—

*Too few students for a reliable report.
**Refer to Caution on page 47.

SECTION 8
STUDENT ACHIEVEMENT OVER TIME

PURPOSE

An important goal of Alberta Education is to measure and report changes in student achievement. Comparing student performance on the 1986 and the 1990 achievement tests is one way of meeting this goal. A direct comparison of the average scores on the 1986 and the 1990 tests cannot be made; although the achievement tests were parallel in form and content, their levels of difficulty may not have been equal. A study was therefore undertaken to permit comparisons of student performance in 1986 and in 1990.

STUDY DESIGN

The study consisted of three parts for the Grade 3 Mathematics and Grade 6 Science tests: test equating, confirming standards, and comparing equivalent items. The Grade 9 English Language Arts study consisted of two parts: test equating and confirming standards.

To equate the 1986 and the 1990 test scores, a large sample population of students were selected to write both the 1986 and 1990 editions of the achievement tests. The students were from schools chosen to be representative of rural, urban, large, and small schools throughout the province.

The year 1986 was chosen because students in that year wrote the same subjects in each grade as students did in 1990.

Based on the test-equating process, the scores for the 1990 population were converted to estimated equivalent 1986 scores, and the 1986 and the 1990 populations were then compared.*

The confirming-standards part of the study involved groups of experienced teachers of grades 3, 6, and 9. Their task was to establish the scores that represent the acceptable standard and the standard of excellence on each of the three achievement tests in 1986 and 1990. The percentage of students meeting each standard for the respective tests was then compared.

For Grade 3 Mathematics and Grade 6 Science, equivalent items were compared. In mathematics, five items from the 1986 test were paired with five equivalent items from the 1990 test. In science, six items from the 1986 test were paired with six equivalent items from the 1990 test. The average score obtained by the 1986 and the 1990 populations of students on their respective sets of equivalent items was compared.

*Two occasional papers are available from the Student Evaluation Branch that provide detailed descriptions of procedures used in analysing provincial achievement-over-time data. They are entitled Equating Multiple-Choice Test Scores and Equating Written-Response Test Scores. These papers may be ordered by contacting Mr. Michael Robinson, Assistant Director, Analytical Services and Special Cases, Student Evaluation Branch, Alberta Education, 11160 Jasper Avenue, Edmonton, Alberta, T5K 0L2.

LIMITATIONS OF THE STUDY

Many factors other than a change in levels of achievement could have contributed to differences in student performance on the 1986 and the 1990 achievement tests. Content, understanding, and use of the bulletin provided by the Student Evaluation Branch may have resulted improved preparation for testing. Teachers in 1990 would have had an opportunity to use the 1986 tests with students for practice and to familiarize them with test-writing techniques. The effects of these variables could not be controlled; caution is therefore required when drawing conclusions about the results of the study.

GRADE 3 MATHEMATICS

A special study comparing student achievement levels in 1990 and 1986 was conducted. Three methods were used to make this comparison: re-administration of the 1986 test, confirming standards for the 1986 and 1990 tests using the same group of judges, and comparing equivalent questions on the 1986 and 1990 tests.

COMPARISON THROUGH RE-ADMINISTERING THE 1986 TEST

In June 1990, 404 Grade 3 students from 14 schools in 13 jurisdictions were selected for test-equating purposes. The schools were chosen to be representative of rural, urban, large, and small schools throughout the province. Based on the results of the test-equating process, the total scores for the 1990 population were converted to estimated equivalent 1986 scores, and the 1986 and the 1990 populations were then compared. Table 8-1 shows the results of the comparison.

Table 8-1
Grade 3 Mathematics
Comparison of 1986 and 1990 Achievement Test Results

Category	1986 Test	1990 Test
Number of Marks	50	50
Number of Students Writing	33 002	33 349
Average Score after Equating	72.3%	71.1%
Standard Deviation after Equating	16.3	16.7

The average 1990 score was lower than the average 1986 score by 1.2 percentage points. A two-tailed t-test showed that this difference was statistically significant beyond the 0.001 level of probability. However, the reliability of the estimated scores is limited by the sample size and selection procedure. Differences must be interpreted with caution.

CONFIRMING STANDARDS

Twenty-one experienced Grade 3 Mathematics teachers from schools throughout the province were selected to participate in confirming standards for this part of the study (see Appendix C).

The teachers reviewed Section I of both 1986 and 1990 tests. They set scores that would represent the standards for each test: the acceptable standard and the standard of excellence. Table 8-2 shows the standards set and the percentage of students achieving those standards.

Table 8-2
Grade 3 Mathematics
Comparison of Percentage of Students Achieving Standards
1986 and 1990

		Acceptable Standard		Standard of Excellence	
Year	Maximum Score	Raw Score Representing Standard	Percentage of Students Achieving At or Above Standard	Raw Score Representing Standard	Percentage of Students Achieving At or Above Standard
1986	50	25	90.1	43	24.8
1990	50	22	91.8	42	26.9

A change of one in the raw score representing the standard will result in a change of approximately four per cent in the number of students meeting the standards.The results revealed that nearly the same number of students met the standards in 1986 and in 1990. Differences of less than four per cent are not significant.

In the judgment of the teachers who set the standards, students achieved the acceptable standard and the standard of excellence as frequently in both test administrations.

EQUIVALENT QUESTIONS

Five questions from the 1990 achievement test were judged to be equivalent to five questions on the 1986 achievement test by the Grade 3 Mathematics Test Review Committee and by the 21 teachers who participated in confirming standards.

Questions were judged to be equivalent if they had all the following characteristics:

1. They tested the same specific curriculum objectives.

2. They required the same level of reading skill.

3. The wording was similar in complexity and quantity of information presented.

4. They required the same number of steps or thought processes.

5. All three distractors were similar in terms of the process required to arrive at those answers.

The average score on the five questions was 69.5% in 1986 and 78.6% in 1990.

CONCLUSION

The results of the test-equating analysis (shown in Table 8-1) indicate that achievement was slightly lower in 1990 than in 1986 but that similar percentages of students achieved acceptable or excellent standards (shown in Table 8-2). As well, students in 1990 achieved higher than students in 1986 when averages for equivalent items were compared. Based on the results from the three methods chosen to compare achievement over time, it was concluded that achievement in 1990 was very similar to achievement in 1986.

GRADE 6 SCIENCE

A special study comparing student achievement levels in 1990 and 1986 was conducted. Three methods were used to make this comparison: re-administration of the 1986 test, confirming standards for the 1986 and 1990 tests using the same group of judges, and comparing equivalent questions on the 1986 and 1990 tests.

COMPARISON THROUGH RE-ADMINISTERING THE 1986 TEST

Seven schools in seven jurisdictions were selected for the study. These schools were chosen to be representative of rural, urban, large, and small schools throughout the province. In June 1990, 230 Grade 6 students who were writing the 1990 test also wrote the 1986 test. Based on the results of the test-equating process, scores for the students who wrote tests in 1990 were converted to estimated equivalent 1986 scores, and the 1986 and 1990 Grade 6 results were then compared. Table 8-3 shows the results of the comparison.

Table 8-3
Grade 6 Science
Comparison of 1986 and 1990 Achievement Test Results

Category	1986 Test	1990 Test
Number of Marks	60	60
Number of Students Writing	30 513	30 820*
Average Score after Equating	61.4%	64.0%
Standard Deviation after Equating	17.2	18.0

*This figure includes students in programs comparable to 1986.

The average 1990 score was higher than the average 1986 score by 2.6 percentage points. A two-tailed t-test showed that this difference was statistically significant beyond the 0.05 level of probability. However, the reliability of the estimated scores is limited because of the sample size and selection process. The difference in achievement scores must therefore be interpreted with caution.

CONFIRMING STANDARDS

Twenty experienced Grade 6 Science teachers from schools throughout the province were selected to participate in confirming standards for this part of the study (see Appendix C).

The teachers reviewed both 1986 and 1990 tests. They set scores that would represent the standards for each test: the acceptable standard and the standard of excellence. Table 8-4 shows the standards set and the percentage of students achieving those standards.

Table 8-4
Grade 6 Science
Comparison of Percentage of Students Achieving Standards
1986 and 1990

		Acceptable Standard		Standard of Excellence	
Year	Maximum Score	Raw Score Representing Standard	Percentage of Students Achieving At or Above Standard	Raw Score Representing Standard	Percentage of Students Achieving At or Above Standard
1986	60	30	82.2	49	23.5
1990	60	31	82.5	49	24.6

The results show that about the same number of students met the acceptable standard in 1990 and in 1986. As well, there was less than a 1% increase in the number of students meeting the standard of excellence in 1990. Since a change of one in the raw score representing the standard will result in a change of approximately four per cent in the number of students meeting the standard, the difference shown is not significant.

In the judgment of the teachers who set the standards, students achieved the acceptable standard and the standard of excellence as frequently in both test administrations.

EQUIVALENT QUESTIONS

Six questions from the 1990 achievement test were judged to be equivalent to six questions on the 1986 achievement test by the Grade 6 Science Test Review Committee and by the 20 teachers who participated in the process of confirming standards.

Questions were judged to be equivalent if they had all the following characteristics:

1. They tested the same specific curriculum objectives.
2. They required the same level of reading skill.
3. The wording was similar in complexity and quantity of information presented.
4. They required the same number of steps or thought processes.
5. All three distractors were similar in terms of the process required to arrive at those answers.

The average score on the six questions was 67.2% in 1986 and 66.9% in 1990.

CONCLUSION

The results of the test-equating analysis (shown in Table 8-3) indicate that achievement rose slightly from 1986 to 1990. Note, however, that the 2.6% increase is within the range of measurement error. The other two measures of achievement over time (the percentage of students meeting the acceptable standard and an analysis of equivalent questions) do not indicate change. In our judgment, which is based on these studies, achievement in science was essentially the same in 1986 and in 1990.

A special study comparing student achievement levels in 1990 and 1986 was conducted. Two methods were used to make this comparison: re-administration of the 1986 test, and confirming standards for the 1986 and 1990 tests using the same group of judges.

COMPARISON THROUGH RE-ADMINISTERING THE 1986 TEST

Eight schools in seven jurisdictions were selected to participate in the study. These schools were chosen to be representative of rural, urban, large, and small schools throughout the province. In June 1990, 261 students who were writing the 1990 test also wrote the multiple-choice portion of the 1986 test, and 65 students who wrote the 1990 test also wrote the written-response portion of the 1986 test. In addition, 150 written responses from 1986 were re-marked by 1990 markers using 1990 marking standards.

The 1986 and 1990 results were converted to a common scale based on 1986 equivalent scores and, for written-responses questions, on 1990 marking standards. The estimated equivalent scores were then compared. Table 8-5 shows the results of the comparison.

Table 8-5
Grade 9 English Language Arts
Comparison of 1986 and 1990 Achievement Test Results

Category	1986 Test	1990 Test
Number of Marks	100	100
Number of Students Writing	29 838	28 857
Average Score after Equating	64.7%	65.6%
Standard Deviation after Equating	15.0	12.5

The average 1990 score was 0.9% higher than the average 1986 score. A two-tailed t-test showed that this difference was statistically significant beyond the 0.001 level of probability. However, caution is advisable when interpreting this slight increase because of the small size of the test-equating sample. This small difference, of less than one per cent, may not be a real difference.

CONFIRMING STANDARDS

Twenty-one experienced Grade 9 English Language Arts teachers from schools throughout the province were selected to confirm standards for the 1990 Grade 9 English Language Arts Achievement Test (see Appendix C). They were among those marking the written-response part of the 1990 test.

These teachers reviewed the multiple-choice parts of both 1986 and 1990 tests. They set scores that would represent the standards for each test: the acceptable standard and the standard of excellence. Table 8-6 shows the standards set and the percentage of students achieving those standards.

Table 8-6
Grade 9 English Language Arts
Comparison of Percentage of Students Achieving Standards
1986 and 1990

			Acceptable Standard		Standard of Excellence	
Test	Year	Maximum Score	Score Representing Standard	Percentage of Students Achieving At or Above Standard	Score Representing Standard	Percentage of Students Achieving At or Above Standard
Total	1986	100	51	82.6	81	13.2
	1990	100	50	82.9	78	10.8
Part A: Written Response	1986	25	13	82.6	20	22.0
	1990	25	13	86.7	20	15.8
Part B: Reading	1986	64	33	77.9	53	17.6
	1990	65	32	74.5	50	13.8

The results revealed that the percentage of students meeting the acceptable standard in 1990 was virtually the same as in 1986. However, the percentage of students meeting the standard of excellence was lower in 1990 than in 1986.

CONCLUSION

The results obtained from equating the 1986 and the 1990 test results (Table 8-5) indicate that overall achievement in 1990 was virtually unchanged compared to 1986. However, results in Table 8-6 indicate that a lower percentage of students achieved the standard of excellence in 1990 than in 1986. This tendency is shown in both the written-response and the reading portions of the test.

In our judgment, which is based on these studies, overall student achievement in Grade 9 English Language Arts in 1990 was about the same as it was in 1986.

APPENDIX A
USING ACHIEVEMENT TEST RESULTS

A SYSTEMATIC APPROACH FOR THE EFFECTIVE USE OF ACHIEVEMENT TEST RESULTS

Achievement test results can be used constructively as one means of improving the quality of education. A systematic use of achievement test results would include the following steps:

1. Comparing test results for a jurisdiction or school to the provincial results. Be sure that your comparisons include the

   - total test score,
   - total and subtest scores for multiple-choice questions,
   - total and subtest scores for written-response assignments (when appropriate),
   - individual multiple-choice question results, and
   - individual written-response question results (when appropriate).

2. Noting any patterns, anomalies, and/or interrelationships in the results.

3. Hypothesizing relationships between your observations and any of the factors listed in Section 2 of this report that may have had an effect on achievement or achievement test results.

4. Considering and implementing a plan that will help to improve the quality of education for students.

AN ADMINISTRATIVE MODEL FOR THE EFFECTIVE USE OF ACHIEVEMENT TEST RESULTS

The following model may be useful for those who wish to develop a constructive system for interpreting achievement test results.

BASIC PRINCIPLES

1. It is desirable and feasible for teachers and school administrators to make use of achievement test results in analysing the performance of their own students.

2. It is more constructive for schools to develop their own analyses, interpretations, and action plans than to have these imposed externally.

3. The impact of factors such as those listed in Section 2 should be analysed and discussed when reviewing achievement test results.

4. Subtest or reporting category results are usually more informative than total test scores.

5. Generalizations should be stated with caution and should be supported by evidence that is independent of achievement test results.

6. It is neither desirable nor productive to compare the results of different schools.

7. Achievement tests measure many of the objectives specified by the curriculum. However, skills and concepts that are not measured by the achievement tests are also to be taught and evaluated at the local level.

8. Staff discussions as well as written reports are useful means of ensuring that results are appropriately interpreted and used.

SUGGESTED CONTENT FOR INTERPRETATION OF INDIVIDUAL SCHOOL RESULTS

1. Subject, grade level, and date of achievement test administration

2. Number of students who wrote the achievement test

3. Profiles of students or groups who wrote the achievement test, which include

   • previous performances
   • number of students repeating the grade

4. Program emphases, such as hours of instruction, skill and content emphases

5. Instructional practices, such as methodology, resources, and the relationship between the program offered and the provincial curriculum

6. Program objectives not measured by the achievement test

7. School results compared with provincial results on subtests

8. Current school results compared with those of previous administrations

9. Discussion of item results, identification of common student errors, and suggestions of ways for reducing the misunderstanding that leads to these errors

10. Recommendations for the following year or semester

11. Summary and concluding comments

SUGGESTED REPORTING STRUCTURE

1. Teachers and/or the principal analyse the results and prepare a written report about each administration of an achievement test.

2. The principal reviews and signs the report.

3. The report is shared with central office supervisory personnel.

4. The appropriate central office supervisory personnel prepare a written response to the report, with copies of the response going to the teachers and the principal.

5. If possible, all involved staff meet to discuss the report and the response.

6. Reports are used to improve the program and maximize future opportunities for student success.

7. When large differences exist between expected and actual achievement test results over time, consideration should be given to conducting a formal program evaluation.

APPENDIX B
DEVELOPING ACHIEVEMENT TESTS

The Student Evaluation Branch develops achievement tests that measure student achievement at the grades 3, 6, and 9 levels. Province-wide testing in Language Arts, Mathematics, Science, and Social Studies follows a four-year cycle for each grade level and subject. Many individuals and groups are involved in the development of each test: practising classroom teachers, school and central office administrators, and representatives of postsecondary institutions, the Curriculum Design Branch, the Language Services Branch, Regional Offices, and the Student Evaluation Branch. Student Evaluation Branch staff ensure the development of valid and reliable tests.

The following is a summary of the phases of the test development process:

1. **Planning**
2. **Approving Blueprints**
3. **Developing Test Questions**
4. **Constructing and Administering Field Tests**
5. **Analysing and Revising**
6. **Constructing Final Field Tests**
7. **Approving Final Field Tests**
8. **Administering Final Field Tests**
9. **Constructing the Final Test**
10. **Preparing and Administering the Final Test**
11. **Marking**
12. **Analysing and Reporting the Results**

Under normal circumstances, it takes three years to complete all phases of the process.

1. PLANNING

Test developers ensure that the design of each achievement test reflects the goals and objectives of the *Program of Studies* and the curriculum specifications for each subject. Planning takes into consideration those parts of the program that are testable in a paper and pencil format, within a given time frame. Teachers and consultants from across the province assist in preparing the design of each test.

Test developers prepare an interim test blueprint (an overall plan used to guide the development of a test). Questions that must be addressed at this point are:

- What knowledge and skills should students be expected to possess?
- What types of questions will constitute the test (multiple choice, short answer, or extended written response)?
- What weighting will each part of the test be given?
- How long and how demanding should the test be?
- How should the results of the test be organized for reporting purposes?

In order to ensure that each test will produce meaningful and reliable results, test developers incorporate statistical as well as curricular standards in the test design. Statistical standards include projected test means, range of question difficulty, and the requirements for reporting. For example, the ideal mean of a multiple-

choice test containing questions with four alternatives is 62.5%. This is the midpoint between chance selection (25%) and perfection (100%). The range of difficulty of multiple-choice questions is expected to vary from 30% to 85% to ensure that students with varying ability levels are challenged.

Each dimension of the curriculum for which results are reported must contain at least six questions if the results are to be meaningful.

2. APPROVING BLUEPRINTS

Blueprint approval establishes the overall design of the test, the exact emphases given to each category for which results are reported, and the emphases given to the different cognitive levels.

The interim blueprint is reviewed by a committee of Alberta Education personnel that represents the Curriculum Design Branch (or Language Services Branch), Regional Office consultants, and the Student Evaluation Branch. This committee makes recommendations to the Director of the Student Evaluation Branch.

The blueprint recommended by the Alberta Education committee is then reviewed by a Test Review Committee, which consists of members nominated by the Alberta Teachers' Association, the Conference of Alberta School Superintendents, postsecondary institutions, and Alberta Education. This committee makes recommendations to the Director of the Student Evaluation Branch.

3. DEVELOPING TEST QUESTIONS

Following blueprint approval, committees of practicing classroom teachers working at the appropriate grade level are formed, and question development meetings are held. These committees develop new test questions that reflect the goals and objectives of the *Program of Studies* and curriculum specifications. Where necessary, question developers are trained in the principles of question construction. Questions built in committee are then screened for format, validity, blueprint 'fit', and other design considerations.

4. CONSTRUCTING AND ADMINISTERING FIELD TESTS

After careful editing and formatting of questions developed by the teacher committees, field tests are constructed. Any required artwork is completed during this phase of the test development process.

With permission from school and jurisdiction personnel, field tests are sent to a number of teachers throughout Alberta. The students involved are representative of the student population for which the test has been designed. A minimum sample of 150 students writes each field test.

Teachers who administer a field test are asked to comment in writing on the following:

- reading level
- how closely the question matches the way in which a concept was taught
- level of difficulty of the questions
- quality of the questions and graphics
- errors of any kind

The results from the administration of this initial round of field tests are used to validate content, to determine difficulty levels, and to ensure that questions are expressed clearly.

5. ANALYSING AND REVISING

The results of each field test are then analysed and scrutinized to determine whether individual

questions require revision. Teacher comments regarding the way that test questions are structured and the way that a subject is being taught are also carefully considered and used to guide revision.

Questions deemed to require changes are revised and submitted for further field testing.

6. CONSTRUCTING FINAL FIELD TESTS

Once the initial field test results are thoroughly analysed and questions requiring changes are revised, final field tests are constructed. These field tests follow the approved blueprint and parallel the actual achievement test in format and design.

Final field tests, like all field tests, are submitted for further validity checking, editing, and proofreading. In grades 6 and 9, separate tests in English and in French are developed for language arts. At this point, all other tests for Grade 6 and Grade 9 are translated into French.

7. APPROVING FINAL FIELD TESTS

After the final field tests have been constructed, a second meeting of the Alberta Education Committee that represents the Curriculum Design Branch (or Language Services Branch), Regional Office consultants, and the Student Evaluation Branch is convened. This committee reviews the final field tests and makes recommendations for improvement.

The Test Review Committee, which approved the blueprint in Phase Two of the test development process, meets a second time to review and recommend for approval the final field tests and the instructions for administering the tests. If a test includes short-answer or extended-writing questions, the Test Review Committee discusses standards of achievement and marking standards appropriate for the test. Again, this committee makes recommendations to the Director of the Student Evaluation Branch.

8. ADMINISTERING FINAL FIELD TESTS

The final field tests are administered and the results are used as a final screen in selecting questions for placement on the provincial achievement test. A minimum sample of 250 students writes each final field test. The sample is selected to include:

- only students who have received instruction in the course
- students representing a normal distribution of ability levels
- students from rural and urban schools
- students from large and small schools

9. CONSTRUCTING THE FINAL TEST

The construction of the final test form is based upon information collected from the final field test administration. The Test Review Committee is reconvened to review the final test form.

The test is submitted for final validity checking, editing, and proofreading. Grade 6 and Grade 9 achievement tests, in subjects other than language arts, are translated into French.

For each test, an information bulletin is prepared that outlines the design and nature of the upcoming tests. These bulletins are distributed to each school in September to facilitate program and instructional planning by teachers and administrators.

10. PREPARING AND ADMINISTERING THE FINAL TEST

The completed achievement test is commercially printed and prepared for distribution. Sufficient copies of the test are mailed to each school. Quantities are based on the number of students enrolled in the subject as reported to the Student Evaluation Branch. The test is administered to students by their classroom teachers.

11. MARKING

All written-response sections of the tests are marked by classroom teachers. These teachers, who are recommended by their superintendents, are currently teaching the course being evaluated, have taught the course for a minimum of two years, and hold a valid Alberta Permanent Professional Certificate. Student Evaluation Branch staff train and supervise the teachers during the marking sessions. All multiple-choice responses are machine scored.

12. ANALYSING AND REPORTING THE RESULTS

Once the test has been written, at least 20 classroom teachers review the test question by question, to judge the appropriateness of the standard built into the test. These teachers identify a test score that reflects student performance at a standard of excellence and a test score that reflects student performance at an acceptable level, based on the requirements of the *Program of Studies*. The teacher assessments are then compared to the actual levels of student achievement on a provincial basis. These results are reviewed by the Test Review Committee, which reconvenes a final time. This committee reviews the results of the test in terms of the objectives of the *Program of Studies* being measured.

A statistical report is prepared and distributed to superintendents, school principals, Alberta Education officials, and other Departments of Education. This report is also made available to the general public. In addition to the *Provincial Report*, each school and jurisdiction receives a statistical summary for its respective student population.

For further information, please refer to the respective Achievement Test Bulletins, or call the Assistant Director, Achievement Testing and Diagnostic Evaluation Programs, at 427-2948.

APPENDIX C
CONFIRMING STANDARDS

RATIONALE

The purpose of standard setting in the Achievement Testing Program is to answer the question of whether provincewide performance is satisfactory. To use standard setting in this way requires two distinct judgments. The first is to predict for a given test what percentage of students tested can be expected to achieve at least the acceptable level of skill and knowledge required to proceed to the next level in that subject, assuming there are adequate teaching and resources. The second is to predict for the same test the test score that represents that level. Two similar judgments are made for the level of skill and knowledge that reflects excellence. Experience has shown that it is reasonable to judge that the expected percentage of students who should achieve the acceptable level is 85% and the expected percentage who should achieve at the level of excellence is 15%.

Satisfactory provincial performance can be said to occur when the percentage of students scoring at or above the predicted test score is equal to or greater than the expected percentage.

ESSENTIAL ELEMENTS

Standard setters must be familiar with both the curriculum and the skills and knowledge characteristics of the students who wrote the test being marked.

The rationale for and purpose of standard setting should be understood by all participating teachers.

The skills and knowledge characteristics of borderline students, with emphasis on those characteristics that affect responses to the achievement test being marked, are discussed in order to refresh the background required by standard setters.

PROCEDURE USED

For the test being marked, standard setters make and record judgments for each question as a percentage of the students predicted to achieve the acceptable level.

Standard setters also make and record similar judgments for the test as a whole at both the acceptable level and the level of excellence.

Using the actual test results, the percentage judgments made by standard setters for each question are then calculated and are expressed as raw scores. The standard setters are then informed of their individual scores and of the median for all the teachers in the group. The individual test scores are presented along with the actual data for the distribution of scores and for the response frequencies. With this information, standard setters are given an opportunity to revise their judgments. The final raw scores are obtained and used to determine the test score at each level.

APPENDIX D
REPORTING TO PARENTS
ANSWERS TO FREQUENTLY ASKED QUESTIONS

What are the achievement tests?

The achievement tests are provincial government tests administered in Alberta schools to grades 3, 6, and 9 students in language arts, social studies, science, and mathematics.

What is the purpose of the achievement tests?

The achievement tests provide information about what students know and can do in language arts, social studies, science, and mathematics. The tests enable Alberta Education to monitor the level of achievement of students throughout Alberta. The results also help local school board, principals, and teachers identify the strengths and weaknesses in their implementation of these subjects.

How many achievement tests will my child have to write?

Students write only one achievement test in Grade 3, one in Grade 6, and one in Grade 9. Tests are rotated so that a different subject is tested each year. In 1990, Grade 3 students wrote the mathematics achievement test, Grade 6 students wrote the science achievement test, and Grade 9 students wrote the language arts achievement test. In 1991, Grade 3 students will write the science achievement test, Grade 6 students will write the mathematics achievement test, and Grade 9 students will write the social studies achievement test.

How should I prepare my child to write an achievement test?

No preparation beyond normal classroom instruction is required to write an achievement test. While students should be encouraged to do their best, a good night's sleep and a relaxed, confident approach to testing are the best possible preparation.

How much do these tests count for my child?

The achievement tests do NOT affect students' final marks. The classroom teacher is responsible for evaluating students and awarding final marks. Achievement test results are not released by Alberta Education until October, long after students' marks have been determined by the classroom teacher.

How do achievement test results help classroom teachers?

Achievement test results provide feedback on student achievement to school boards, principals, and teachers. For example, teachers in a school that consistently scores high on one part of the curriculum but low on another may wish to examine their programs to see if changes are needed to achieve a better instructional balance.

What are the limitations of the achievement tests?

Paper and pencil tests cannot easily measure such things as laboratory skills, small group discussions, and creative thinking. Thus, some student strengths can be evaluated only by the classroom teacher. Also, a single test cannot reveal as much about a student's development and growth as can evaluation by the classroom teacher over the course of a full school year.

What advantage do achievement tests have over other standardized tests?

Unlike commercially developed tests, achievement tests are based specifically on Alberta's

programs of study and are designed, written, and evaluated by experienced classroom teachers from across the province. Tests developed elsewhere may not reflect curriculum or standards appropriate for Alberta.

How do I interpret achievement test results?

The Achievement Testing Program *Provincial Report* includes guidelines for interpreting results. Readers are cautioned not to overgeneralize conclusions based on a single administration of the test. Results should be compared with expectations or with the results of previous achievement tests in the same subject. Any trends that are observed in the scores must then be interpreted in the context of a variety of factors that could affect student achievement, such as the school and community environment, students' socioeconomic background, and available learning resources.

Comparisons between districts, schools, or classrooms are likely to prove misleading and are therefore discouraged.

Can I find out how my child did on the achievement test?

Individual results on the achievement tests are made available to school principals. Since the tests are designed to gather information on groups of students, not on individuals, individual results must be interpreted with caution.

Where can I get additional information about the Achievement Testing Program?

Bulletins describing the content of the coming year's achievement tests and the *Provincial Report* describing the results of the previous year's testing are distributed to schools each fall. Requests for copies of these publications or questions and comments regarding the Achievement Testing Program should be directed to:

Mr. Dennis Belyk
Assistant Director
Achievement Testing and Diagnostic Evaluation Programs
Student Evaluation Branch
Alberta Education
Devonian Building, West Tower
11160 Jasper Avenue
Edmonton, Alberta T5K 0L2

ACHIEVEMENT TESTING PROGRAM
PROVINCIAL REPORT QUESTIONNAIRE

The Student Evaluation Branch strives to produce documents that will be useful to the educational community. The purpose of the following questionnaire is to garner your opinions about the *Provincial Report*. These opinions can be considered when the content and format of the report are reviewed before June 1991.

Please take a moment to respond to the following questions. Then detach this sheet and send it to:

Mr. Michael Robinson
Assistant Director, Analytical Services and Special Cases
Student Evaluation Branch
Alberta Education
11160 Jasper Avenue
Edmonton, Alberta T5K 0L2

USE OF THE REPORT

1. Please check the box beside the statement that applies to you.

   My present role is primarily that of

   - teacher ☐ 1
   - school administrator ☐ 2
   - central office administrator ☐ 3
   - school board member ☐ 4
   - other (please specify) _____

2. Please check the box beside the statement that applies to you.

   I read the report, but I DID NOT use it to interpret the results attained by my students. ☐ 5

   I read the report, and I used it to interpret the results attained by the students in

   - my classroon ☐ 6
   - my school ☐ 7
   - my jurisdiction ☐ 8

3. Please respond to the following statement if you have checked boxes 6, 7, or 8 above.

   I have made use of the results to alter the educational program offered in

   - my classroon ☐ 9
   - my school ☐ 10
   - my jurisdiction ☐ 11

Continued

CONTENT OF THE REPORT

1. Please judge the usefulness of the information included in the various sections of the report by checking the appropriate boxes below.

	Very Useful	Adequate for Use	Of Some Use	Of No Use
Section 1: Summary of Achievement Test Results	☐ 12	☐ 13	☐ 14	☐ 15
Section 2: Guidelines for Interpreting Achievement Test Results	☐ 16	☐ 17	☐ 18	☐ 19
Sections 3 to 5: Specific Achievement Test Results	☐ 20	☐ 21	☐ 22	☐ 23
Section 6: Student Achievement By Gender	☐ 24	☐ 25	☐ 26	☐ 27
Section 7: Student Achievement By Age	☐ 28	☐ 29	☐ 30	☐ 31
Section 8: Student Achievement Over Time	☐ 32	☐ 33	☐ 34	☐ 35

2. If you wish, please comment further on the content of the report in the space below.

FORMAT OF THE REPORT

1. Please judge the usefulness of the report's format by checking the appropriate boxes below.

	Very Useful	Adequate for Use	Of Some Use	Of No Use
Organization into Separate Sections	☐ 36	☐ 37	☐ 38	☐ 39
Double-Column Presentation of Text	☐ 40	☐ 41	☐ 42	☐ 43
Presentation of Figures	☐ 44	☐ 45	☐ 46	☐ 47
Presentation of Tables	☐ 48	☐ 49	☐ 50	☐ 51
Blending of Information in Text, Figures, and Tables	☐ 52	☐ 53	☐ 54	☐ 55

2. If you wish, please comment further on the format of the report in the space below.